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TWENTY-THIRD ANNUAL REPORT

OF THE

State Board of Health

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OF THE

STATE OF OHIO

FOR THE

YEAR ENDING DECEMBER 31

1908

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The Springfield Publishing Company,
State Printers.
1909.

LETTER OF TRANSMITTAL

OHIO STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY.

COLUMBUS, OHIO, April 19th, 1909.

To His Excellency, Judson Harmon, Governor of Ohio:

SIR:—In accordance with Section 18 of an "Act amending an act to create and establish a State Board of Health," passed May 9th, 1908, the accompanying report, which is for the calendar year 1908, is herewith submitted.

Respectfully,

C. O. PROBST,

Secretary.

26911

MEMBERS OF THE OHIO STATE BOARD OF HEALTH

*Darwin G. Palmer, M. D., President, Geneva	December, 1915
Byron Stanton, M. D., Vice-President, Cincinnati	December, 1909
J. C. Crossland, M. D., Zanesville	December, 1910
Wm. T. Miller, M. D., Cleveland	December, 1911
Frank Warner, M. D., Columbus	December, 1912
W. C. Chapman, M. D., Toledo	December, 1913
Josiah Hartzell, Ph. D., Canton	December, 1914

C. O. Probst, M. D., Secretary.

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*Darwin G. Palmer, M. D., reappointed.

GENERAL REPORT

This is the twenty-third annual report of the State Board of Health, and is for the year ending December 31, 1908.

As the report embraces matters included in the annual reports of local boards of health, which are to be submitted on or before the fifteenth day of January of each year, there is necessarily some delay in its preparation.

PERSONNEL OF THE BOARD.

The personnel of the Board remains unchanged from last year. The term of office of Dr. Darwin G. Palmer, of Geneva, having expired on December 13, 1908, he was reappointed by Governor Harris for a term of seven years, and the appointment was subsequently confirmed by the Senate.

ANNUAL REPORT.

Only the more important among the various operations of the Board during the year can be chronicled in its annual report. A general review of these may be given under different headings as follows:

COMMUNICABLE DISEASES.

In the suppression of dangerous communicable diseases the Board is called upon principally to assist the local health authorities, whose duty it is under the law to enforce restrictive measures. In most instances such assistance can be given by telephone or correspondence, and this is of daily occurrence.

Information is requested regarding quarantine and releasing of quarantine, disinfection, treatment of suspects, closing of schools, etc., and especially as regards the laws governing these and related matters. At times a representative of the Board must be sent to settle a dispute in diagnosis, to give support to the enforcement of possibly an unpopular measure, or, not infrequently, to insist upon a little more activity upon the part of the local officials.

There is an unnecessarily large loss of life each year from clearly preventable diseases. While the prevalence of such diseases as typhoid fever, diphtheria, scarlet fever, is due in part to sociological conditions that cannot be radically changed in short periods, they can be largely controlled by active health officials, if properly supported by the public.

Diphtheria and scarlet fever prey largely upon children, and it seems strange that parents, who hold their offspring as their dearest possessions, should not be willing to give unlimited power and funds to defend their lives. Property interests are well guarded, while health interests are everywhere largely neglected. It is probably safe to say that one hundred dollars is spent to protect property for every dollar expended to protect health.

The public is just awakening to these conditions. In many communities Health Leagues are being formed. We have Boards of Trade and Chambers of Commerce—*trade, commerce*—to look after the material, the financial, prosperity of our cities. If the same quality of men, with their push and energy, would give equal time to the protection of public health, how much more joy and happiness there would be in the world, and especially in the homes, now saddened by death which such body of men might undoubtedly prevent. They would soon see that at present we are fighting our worst enemies with a straggling, inadequate army of poorly paid, badly equipped health officers.

A legislative measure was framed with the aid of the Legislative Committee of the State Medical Society calling for a competent fairly well paid deputy state health officer in each county, with power to appoint assistants in each city, village and township. It was found to be unconstitutional to have such county officers *appointed*, which was deemed necessary to secure the right kind of men, so the measure was dropped.

The State Board of Health is greatly in need of assistance of this kind for the control of contagious and infectious diseases. In these days of easy, frequent intercommunication, uncontrolled communicable disease in any part of the state endangers the whole. The next Legislature will possibly be requested to provide for the appointment by the State Board of Health of a sufficient number of well qualified medical inspectors to enable it to promptly investigate, and take charge, if necessary, of all serious outbreaks of the dangerous diseases spread by human contact.

During the past year the Board has been called upon to render personal assistance in the suppression of such diseases in the following places: Santa Fe, Lakeview; Adams Township, Champaign County; Union Township, Miami County; Mansfield, Cecil; Oregon Township, Lucas County; Jerry City; Akron Township, Summit County; Hamilton Township, Warren County; Girls' Industrial School at Delaware; Pierce Township, Clermont County; Commercial Point, Millersburg, Piqua, Bowerston, Holloway, Sherodsville, Tippecanoe; Mill Township, Tuscarawas County; Monclova Township, Lucas County; Zanesville, Chillicothe, Richmondale, Cleves, Bellefontaine; Harrison Township, Darke County; German Township, Darke County; Glencoe, Hollansburg, Moxahala, Marion, New Bremen, Bethesda, Carrollton, Kalida, Malinta, Norwich, Morral, Madisonville, Owensville; Prairie Township, Holmes County; West Mansfield, Rising Sun, Gnadenhutten, Tippecanoe City, Fredericksburg, Deavertown, Pemberville and Wilberforce.

SMALLPOX.

Smallpox has occurred to some extent during the year, but has not assumed epidemic proportions at any time. The disease continues to be mild in character. Following the custom since this extraordinary form of smallpox appeared in Ohio in 1908, the location of cases reported is given in the following table:

Cases and Deaths from Smallpox Reported to the State Board of Health from January 1 to December 31, 1908.

County.	Place.	Cases.	Deaths
Adams	Jefferson Township	1	....
Allen	German Township	3	2
	Delphos	6	....
	Lima	8	....
Ashland	Ashland	14	....
	Green Township	1	....
	Mifflin	1	....
	Vermilion Township	5	....
Ashtabula	Conneaut	1	....
	Conneaut Township	9	....
Athens	Buchtel	2	....
	Jacksonville	1	....
	Trimble Township	3	....
	York Township	3	....
Auglaize	German Township	2	....
	Jackson Township	3	....
	Minster	15	....
	New Bremen	2	....
	St. Marys Township	7	....
	Washington Township	1	....
Belmont	Bellaire	2	....
	Flushing	1	....
	Goshen Township	4	....
	Holloway	20	....
	Wayne Township	2	....
Butler	Hamilton	130	....
	Middletown	1	....
	Oxford	11	....
	Oxford Township	3	....
	St. Clair Township	9	....
	Somerville	1	....
Carroll	Carrollton	2	....
	Leesville	2	....
	Monroe Township	19	....
	Orange Township	33	....
	Sherodsville	98	....
Champaign	Urbana	3	....
	Wayne Township	1	....
Clark	Bethel Township	1	....
	New Carlisle	11	....
	Springfield	1	....
Clermont	Jackson Township	10	....
	Owensville	10	....
	New Richmond	13	....
	Pierce Township	4	....
	Union Township	1	....

CASES AND DEATHS FROM SMALLPOX REPORTED, ETC.—Continued.

County.	Place.	Cases.	Deaths
Clinton	Sabina	1	....
Columbiana	Butler Township	1	....
	Salineville	9	....
Crawford	Auburn Township	4	....
	Bucyrus	3	....
Cuyahoga	Cleveland	1	....
Darke	German Township	9	....
	Harrison Township	1	....
	Hollansburg	2	....
	Palestine	2	....
Defiance	Highland Township	6	....
	Noble Township	2	....
Delaware	Marlboro Township	3	....
Erie	Sandusky	1	....
Franklin	Clinton Township	5	....
	Columbus	49	....
	Marion Township	3	....
	Mifflin Township	7	....
	Norwich Township	6	....
Fulton	Swanton	1	....
Gallia	Gallipolis	1	....
	Green Township	1	....
Greene	Beaver Creek Township	1	....
Guernsey	Cambridge	4	....
Hamilton	Cincinnati	338	3
	Cleves	6	....
	Green Township	1	....
	Hartwell	5	....
	Lockland	3	....
	Mt. Washington	1	....
	St. Bernard	1	....
	Sycamore Township	1	....
	Wyoming	5	....
Hancock	Jackson Township	1	....
Harrison	Bowerston	2	....
	Washington Township	15	....
Hocking	Murray City	30	....
	Ward Township	14	....
Holmes	Hardy Township	3	....
	Monroe Township	3	....
	Prairie Township	1	....
Knox	Brown Township	1	....
	Clinton Township	8	....
	Mt. Vernon	2	....
	Pike Township	42	....
	Union Township	1	....
Lawrence	Fayette Township	2	......
	Ironton	1	....
	Mason Township	7	....
	Upper Township	6	....
Licking	Licking Township	10	....
	Newark	3	....
Logan	Bellefontaine	12	....
	Jefferson Township	1	....
	Pleasant Township	1	....
	West Mansfield	7	....
Lorain	Lorain	8	....
	Oberlin	10	....
	Russia Township	1	....

CASES AND DEATHS FROM SMALLPOX REPORTED, ETC. Continued.

County.	Place.	Cases.	Deaths
Lucas	Monclova Township	10	
	Toledo	51	
Marion	Claridon Township	1	
	Marion	26	
	Morral	3	
	Scott Township	1	
Mercer	Mendon	6	
Miami	Covington	3	
	Piqua	3	
	Potsdam	1	
	Staunton Township	2	
	Tippecanoe City	1	
	Troy	135	1
Montgomery	Clay Township	1	
	Dayton	37	
	Harrison Township	5	
	Jefferson Township	1	
	Mad River Township	4	
	Randolph Township	1	
	Wayne Township	4	
Morrow	Congress Township	2	
	North Bloomfield Township	1	
Muskingum	Newton Township	4	
	Norwich	15	
	Springfield Township	6	
	Union Township	1	
	Zanesville	6	
Paulding	Antwerp	1	
	Cecil	3	
	Paulding	2	
Perry	Coal Township	5	
	Pleasant Township	1	
	Reading Township	4	
Pickaway	Circleville	2	
	Commercial Point	17	
	Scioto Township	1	
Preble	Camden	1	
Putnam	Blanchard Township	3	
	Cloverdale	6	
	Continental	19	
	Greensburg Township	4	
	Kalida	10	
	Ottawa	1	
	Palmer Township	27	
	Pandora	6	
	Riley Township	5	
Richland	Jackson Township	10	
	Lexington	1	
	Madison Township	25	
	Mansfield	48	
	Mifflin Township	3	
	Monroe Township	14	1
	Plymouth	1	
	Springfield Township	2	
	Washington Township	3	
	Worthington Township	10	1
Ross	Chillicothe	22	
	Concord Township	35	
	Deerfield Township	6	

Cases and Deaths from Smallpox Reported, Etc.—Concluded.

County.	Place.	Cases.	Deaths
Ross—Con.	Green Township	12	....
	Harrison Township	5	....
	Jefferson Township	2	....
	Liberty Township	70	....
	Scioto Township	1	....
	Springfield Township	4	....
Scioto	Clay Township	4	....
	Portsmouth	9	....
Seneca	Big Spring Township	2	....
	Clinton Township	40	....
	Fostoria	41	....
	Jackson Township	17	....
	Tiffin	1	....
Shelby	Van Buren Township	6	....
Stark	Canton	4	....
	Louisville	8	....
	Marlboro Township	1	....
	Plain Township	1	....
Summit	Akron	34	....
	Copley Township	1	....
Tuscarawas	Barnhill	15	....
	Dennison	5	....
	Fairfield Township	1	....
	Goshen Township	16	....
	Mill Township	3	....
	Warren Township	5	....
Trumbull	Warren	3	....
Van Wert	Liberty Township	5	....
Warren	Hamilton Township	1	....
Washington	Marietta	4	....
Wayne	Franklin Township	1	....
Williams	Bridgewater Township	2	....
	Montpelier	3	....
	Northwest Township	1	....
	Stryker	1	....
Wood	Bowling Green	1	....
	Freedom Township	6	....
	Jackson Township	8	....
	Pemberville	28	....
	Perry Township	2	....
	Ross Township	12	....
Wyandot	Antrim Township	2	....
Total	63 Counties, 209 Places	2,173	8

WATER AND SEWERAGE.

Questions relating to water and sewage have occupied a good share of the Board's attention. The responsibility of having to approve all plans for the introduction, or change or extension, of public water supplies and sewerage systems, has necessitated the careful study of various engineering and economic problems. Local authorities having in charge the introduction of a public water supply or sewerage system not infrequently fail to give proper weight to the health interests involved, especially when a change in plan involves an increased expenditure.

The Board has endeavored to carefully consider the merits of each proposition presented to it for approval. In the case of sewerage, the rights of riparian owners *below* the proposed sewer outlet have not been overlooked. It is often difficult, however, to convince a community that it is their duty to spend a considerable sum to purify its sewage, and for which they receive no direct benefit.

Close supervision has been kept of all purification plants for water or sewage. Frequent inspections have been made of such plants in course of construction to insure their being put in according to the plans approved by the Board.

A complete report on all public water supplies is being prepared from data which have been collected during the past two years, and from additional information obtained during the year. A detailed study upon the ground has been made of each water supply.

The most important event of the year as regards the protection of public water supplies was the passage by the General Assembly of what is known as the Bense Act, which was prepared by the State Board of Health. Some of the leading engineering journals at home and abroad have pronounced this the most advanced legislation upon this subject so far achieved.

Under the provisions of this act the Board may require any community to purify water or sewage; and it gives the Board control of the operations of water and sewage purification plants.

The strong point in the act is that municipalities may spend 5% of their taxable values, beyond all other allowable indebtedness, for such improvements when ordered by the Board.

The Board has already outlined its policy to be a conservative one in its use of this extraordinary power. With the proper enforcement of this act, backed by a growing public sentiment in favor of its objects, it should be possible to gradually reclaim our streams and lakes and to insure the purity of all public water supplies.

Complaints under the Bense Act have been received and investigated as follows:

Against Van Wert for the pollution of Town Creek.

Against Bowling Green for the pollution of Poe (a county) Ditch.

Against Greenville for the pollution of Greenville Creek.

Against Fostoria for the pollution of the east branch of the Portage River.

Against the National Military Home for the pollution of the Great Miami River.

Against the Victor Stamping Works, Symmes Township, Hamilton County, for the pollution of the Little Miami River.

Against the Ohio & Pittsburg Milk Company for the pollution of a water course in Orwell Township, Ashtabula County.

Against Wyoming and Lockland for the pollution of a tributary to Mill Creek.

Against Darke County Infirmary for the pollution of Bridge Creek.

Against The Ohio Boxboard Company for the pollution of Chippewa Creek.

Against Alliance for the pollution of the Mahoning River.

Against Delphos for the pollution of Jennings Creek and the Auglaize River.

Against Cambridge for the pollution of Wills Creek.

Against Elmore for the pollution of the Portage River.

Against Marysville for the pollution of Mill Creek.

Against Wellston for the pollution of Meadow Run.

Against the Thackery Creamery Co. for the pollution of Chapmans Creek.

Orders were issued by authority of this act to the cities of Van Wert, Bowling Green, Greenville and Alliance to install satisfactory sewage purification works before the year 1910.

It has been intimated that the constitutionality of this act will be questioned. The Board seeks an opportunity to have the Supreme Court pass upon this question.

A copy of the act follows:

AN ACT

To authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution.

[Passed April 7, 1908.]

Sec. 1. [Pollution of streams, etc.; complaints; how made; investgation; action to be taken by board; cities and villages on Ohio river excepted.] Whenever the council, or board of health of any city or village, or the commissioners of any county, or the trustees of any township make complaint in writing to the state board of health, setting forth that a city, or village or corporation or person is discharging or permitting to be discharged any sewage or other wastes into any stream, water course, lake or pond and is thereby creating a public nuisance detrimental to health or comfort, or is polluting the source of any public water supply, it shall be the duty of the state board of health to forthwith inquire into and investigate the conditions complained of; and whenever the state board of health finds after investigation that the source of public water supply of any city, village or community in this state is being subject to contamination or has been rendered impure by reason of the discharge of sewage or other wastes, or in any other manner by any city, village, corporation or person; or whenever said board finds that such sewage or other wastes have so corrupted any stream, water course, lake or pond as to give rise to foul and noxious odors, or to conditions detrimental to the health or comfort of those residing in the vicinity of such stream, water course, lake or pond, it shall notify such city, village, corporation or person causing the contamination or pollution of any such stream, water course, lake or pond of its findings and give them an opportunity to be heard, and after such hearing if the state board of health determines that improvements or changes are necessary and should be made, it shall report its finding to the governor and attorney general, and upon their approval said board shall notify such city, village, corporation or person to install such works or means satisfactory to said board, for purifying or otherwise disposing of its sewage or other wastes, or to change or enlarge existing works in a manner to be satisfactory to said board; such works or means must be completed and put into operation within a time to be fixed by said board, which time shall be subject to the approval of the governor and attorney general. Provided that no city or village that is now discharging sewage into any river which separates the state of Ohio from another state shall be required to install sewage purification works as long as the unpurified sewage of cities or villages in any other state is discharged into said river above said Ohio city or village. [O. L. v. 99, p. 74.]

Sec. 2. [Water supply; complaints in regards to; how made; investigation and action by board.] Whenever the board of health or health officer of any city or village, or ten per cent. of the electors thereof file with the state board of health a complaint in writing, setting forth that it is believed that the public water supply of such city or village is impure and dangerous to health, it shall be the duty of the state board of health to forthwith inquire into and investigate the conditions complained of; and whenever the state board of health finds after investigation, that the public water supply of any city or village is impure and dangerous to health and that it is not practicable to sufficiently improve the character of such supply by removing the source or sources of pollution affecting it, or if said board finds that such water supply is being rendered impure by reason of improper construction or inadequate size of existing water purification works, it shall notify such city, village, corporation or person owning or operating such water supply of its findings and give them an opportunity to be heard, and after such hearing if the state board of health determines that improvements or changes are necessary and should be made, it shall report its findings to the governor and attorney general, and upon their approval said board shall notify such city, village, corporation or person owning or operating such water supply to change the source of supply or to install and place in operation water purification works or device satisfactory to said board, or to change or enlarge existing water purification works in a manner satisfactory to said board, within a time to be fixed by said board, which time shall be subject to the approval of the governor and attorney general. [O. L. v. 99, p. 75.]

Sec. 3. [Water and sewage purification works; board may issue orders to secure better results.] Whenever the state board of health finds, upon investigation, that any water or sewage purification works, on account of incompetent supervision or inefficient operation, is not producing an effluent as pure as might reasonably be obtained from such plant, and by reason of which any public water supply has become dangerous to health, or any stream or body of water has become offensively polluted, or has become a public nuisance, said board shall issue an order to the officer, board or department of any city or village, or the corporation or person having charge of or owning such plant, to secure an effluent as pure as might be reasonably expected from such plant and satisfactory to said board; and if such officer, board or department of any city or village, or such corporation or person fails, for a period of five days after receiving such order, to secure such an effluent, the state board of health shall report the fact to the governor and attorney general and upon their approval may order such officer, board or department, or owner of such plant, to appoint within ten days, and pay the salary of, a competent person, to be approved by said state board of health to take charge of and operate such works so as to secure the results demanded by the state board of health. [O. L., v. 99, p. 76].

Sec. 4. [In case of disagreement may submit question to sanitary engineers; powers of referees; expenses and fees; how paid.] If in any case any order of the state board of health, when approved by the governor and attorney general, and made in pursuance to the provisions of this act, is not acceptable to any city, village, corporation or owner affected thereby, such city, village, corporation or owner shall have the right of appeal as follow, to-wit: The necessity for and reasonableness of such order may be submitted to two reputable and experienced sanitary engineers, one to be chosen by the city, village, corporation or owner to which such order of the state board of health applies and the other chosen by the state board of health, who shall not be regularly employed by said board, and who shall act as referee engineers. If the engineers so chosen are unable to agree then they shall choose a third engineer of like standing, and the vote of the majority shall be final and binding. The referee engineers, herein provided for, shall have power to affirm, modify, or reject, the order of the state board of health submitted to them, and their decision, as reported in writing to the governor and attorney general, which shall be rendered within a reasonable time, shall be accepted by the state board of health, and shall be enforced by said board in the manner provided for in this act. The fees and expenses of said referee engineers shall be equally divided between the city, village, corporation or owner requesting such reference and the state board of health. [O. L., v. 99, p. 76.]

Sec. 5. [Revenues; how raised; and expended.] It shall be the duty of every such municipal council, department or officer having jurisdiction to provide for the raising of revenues by tax levies, sale of bonds, or otherwise to take all steps necessary to secure the funds for any such purpose or purposes; and when so secured, or the bonds thereof have been authorized by the proper municipal authority, the same shall be considered as in the treasury and appropriated for such particular purpose or purposes, and cannot be used for any other purpose; provided, that the bonds herein authorized to be issued for the purposes enumerated in this act shall not exceed five per cent. of the total value of all property in any city or village, as listed and assessed for taxation, which may be in addition to the total bonded indebtedness allowable under the provisions of section two thousand eight hunderd and thirty-five of the Revised Statutes, but the question of the issuance of such bonds shall not be required to be submitted to a vote. [O. L., v. 99, p. 77.]

Sec. 6. [Penalty; power of governor and attorney general to remit penalty.] If any council, department or officer of any municipality, or person or private corporation, shall fail or refuse for a period of thirty days after notice given him or them by the state board of health of its findings and the approval thereof by the governor and attorney general of the state of Ohio, to do and perform any act or acts required of him or them to be done and performed by this act, such members of council or department, and such officer or officers, or person or private corporation shall be and become personally liable for such default, and upon conviction thereof shall forfeit and pay to the state board of health five hundred dollars to be deposited with the state treasurer to the credit of said board; provided, however, that the governor and attorney general, upon good cause shown, may, in their discretion, remit said penalty, or any part thereof. [O. L., v. 99, p. 77.)

Sec. 7. [Prosecutions; by whom brought and where.] An action may be begun for the recovery of any such penalty by the prosecuting attorney of any county in the name of the state of Ohio in the court of common pleas of such county having jurisdiction of any such party or parties; or it may be begun by the attorney general in any such county or in the county of Franklin, as provided for by sections 210 and 211 of the Revised Statutes of Ohio. [O. L., v. 99, p. 77.]

OHIO RIVER POLLUTION.

The Bense Act expressly excludes the Ohio River from its provisions. It would be manifestly unfair and of little use to require an Ohio city on the banks of this river to purify its sewage for the protection of a public water supply when the sewage of a city above in another state was permitted to discharge its unpurified sewage into the same stream.

The question arose as to the power of the Federal Government to prevent the pollution of this and other interstate streams. This question was submitted to the Attorney General of Ohio, who rendered the following opinion:

The question submitted requires an examination of the jurisdiction over navigable streams vested in the Congress of the United States and in the legislatures of the several states. If the question contemplates making an application of the rules of law to the Ohio River and kindred streams, it will be observed by the legislation of Congress bearing thereon that the control over such streams by Congress is merely to insure open navigation, free from obstructions or anything which might interfere with some express federal power. It was said by the United States District Court for the District of California, in Woodruff v. North Bloomfield Gravel Mining Co., 18 Federal Rep. 753, that (quoting from page 770):

> "As to Congress, it might be sufficient to say that it has no authority whatever to say what shall or shall not constitute a nuisance within a state, except so far as it affects the public navigable waters and interferes with interstate or foreign commerce or obstructs the carrying of the mails. Under its authority to regulate commerce between states, and especially post roads, Congress may doubtless declare and punish as such the obstruction of the navigable waters of the state as a nuisance to interstate and foreign commerce, and there its authority ends."

This authority of Congress is evidenced in part by the acts of September 19, 1890 (26 Statutes at large, 453), of August 18, 1894 (28 statutes at large, 363), and of March 3, 1899 (30 Statutes at large, 1153). These, in substance, all declare it to be unlawful to throw, discharge or deposit from or out of any craft of any kind, or from any shore, wharf, manufacturing establishment or mill of any kind, any refuse matter of any kind or description whatever, into any navigable water of the United States, or into any tributary of any navigable water, whereby navigation shall or may be impeded or obstructed.

Regarding the title to such waters, and the soils under them, the Supreme Court of the United States early decided, in the case of Martin v. Waddell, 16 Peters, 410, that:

> "When the Revolution took place, the people of each state themselves became sovereign, and in that character hold the absolute right of all navigable waters, and the soils under them, for their own common use, subject only to the rights since surrendered by their constitution. That the right of eminent domain over the shores and the soils under the navigable waters, for all municipal purposes, belong exclusively to the states within their respective territorial jurisdiction, and they, and they only, have the constitutional power to exercise it."

The rule as announced by our own supreme court is that:

> "He who owns the land on both banks of a navigable river owns the entire river, subject only to the easement of navigation."—Walker & Fulton v. Board of Public Works, 16 Ohio, 540.

The same rule was held applicable to a stream not navigable. (Benner v. Blattee, 6 Ohio, 504.) This doctrine was reaffirmed in Lamb v. Ricketts, 11 Ohio, 311. These cases make no discrimination at to rivers, whether navigable or not, but in fact hold that there is no difference in the ownership of the bed of such rivers. (People v. Canal Appraisers, 33 N. Y., citing page 489.)

It is thus apparent that as to the pollution of navigable streams by municipalities the federal government does not assume to control, or in any way regulate the same, but recognizes the jurisdiction of the several states so to do. This is in keeping with the well-recognized doctrine regarding the police powers of the states. All such legislation is predicated upon, and is the outgrowth of the police power, and concerning its exercise the Supreme Court of the United States has said:

> "The police power is inherent in the several states, and is left with them under the federal system of government, and may always be exercised by state legislatures. It follows that the federal government cannot exercise any police power within the several states, but can exercise such power only where the authority of Congress excludes, territorially, all state legislation. (U. S. v. DeWitt, 9 Wallace (U. S.), 41; Slaughterhouse cases, 16 Wallace (U. S.) 36; Munn v. Illinois, 94 U. S. 113)."

On the strength of this opinion the Board had introduced in Legislature the following joint resolution:

JOINT RESOLUTION.

Providing for a commission to recommend measures to prevent the pollution of the Ohio River, and requesting the legislatures of the states of Pennsylvania, West Virginia, Indiana and Kentucky to co-operate by appointing similar commissions.

Whereas, The Ohio River is known to be polluted by the sewage and other deleterious waste matters from municipalities in the states of Ohio, Pennsylvania, West Virginia, Indiana and Kentucky; and

Whereas, Many communities in each of said states depend, and must necessarily continue to depend, upon the Ohio River as their only source of public water supply; and

Whereas, The pollution of said river has already reached the point where the health of the inhabitants of Ohio River cities and towns is seriously jeopardized thereby; and

Whereas, Such pollution must inevitably increase unless proper measures to prevent it are promptly taken; and

Whereas, The protection of the Ohio River against dangerous contamination is possible only by the joint action of the legislatures of the several states affected thereby; therefore

Be it resolved by the General Assembly of the State of Ohio:

That the governor of the state of Ohio appoint a commission of three persons, who shall serve without compensation, but whose actual and necessary expenses shall be paid, said commission to investigate the condition of the Ohio River as regards pollution, and report to the governor with recommendations for such legislative action as they may deem wise and necessary.

That the governor of the state of Ohio request the governors of the states of Pennhslvania, West Virginia, Indiana and Kentucky to appoint a similar commission for yteir respective states to confer and act with the Ohio commission, and with one another, to the end that a plan may be recommended whereby the several states interested may jointly protect the Ohio River against sewage and other pollution.

Ohio Laws, Vol. 99, page 637.

This resolution was adopted, and an appropriation of $1,000 was made for the expenses of the commission. The following were appointed members of the commission: Edward E. Corn, of Ironton; Dohrman J. Sinclair, of Steubenville, and Dr. Samuel C. Swartsel, of Cincinnati.

They met, and organized by electing Judge E. E. Corn as President, and the Secretary of the State Board of Health as Secretary.

The states of Pennsylvania, Kentucky and West Virginia have taken action looking towards necessary cooperation.

It is hoped that this joint commission will be able, through educational and legislative channels, to bring about, gradually, purification of the Ohio River, and to preserve it against future contamination.

SPECIAL INVESTIGATIONS.

The report of the special investigation of all water and sewage purification plants in Ohio, made by direction of the Legislature, has been printed and distributed. The report, comprising 888 pages of text and tables, has received many words of commendation. The information gained will be of the greatest value to the Board in passing upon plans for similar plants for the many Ohio cities and villages that must eventually make provision for the purification of water or sewage.

Four special investigations have been under way during the past year.

A comprehensive study is being made of the Mahoning River under varying conditions. This river receives large amounts of sewage and industrial wastes, and yet furnishes the water supplies of Alliance, Warren and Youngstown. The two latter cities have water purification plants.

Special attention is being given to the question of the degree of protection afforded by such plants where a highly polluted water must be handled. Other interesting questions in stream pollution and water purification bearing upon public health are being considered in this inquiry.

At Athens, where there is a large abattoir, the Board has installed an experimental plant for purifying liquid slaughter house wastes. At Sunbury, the Board has charge of another experimental plant for disposing of creamery wastes. The wastes from both these industries are sources of frequent and deserved complaint in many parts of the state. The Board hopes to be able to publish working plans of purification works that will enable such waste matters to be economically handled without offense.

The Board is also making a special study of garbage disposal. A special laboratory has been fitted up for this work, and representative samples of garbage from a number of cities are being examined with the view to determining the best methods for their disposal.

The results of the various special investigations will be fully set forth in later reports.

QUARTERLY BULLETIN.

The Board began the publication of a monthly sanitary bulletin in 1888. This, with an occasional monthly intermission, has been continued to the present time. It has been decided to publish in its stead a quarterly bulletin to be known as the QUARTERLY BULLETIN, OHIO STATE BOARD OF HEALTH, and to use its pages for reporting many features of the Board's work which should be given to the public promptly, and which are now published in the annual report, where they are largely lost sight of. This will also result in cutting down the size of the annual reports, which is deemed desirable.

MATERNITY BOARDING HOUSES AND LYING-IN HOSPITALS.

The General Assembly, against the protest of the Board, charged it with the duty of enforcing the provisions of the following act:

AN ACT

To regulate the establishment, maintenance and inspection of maternity boarding houses and lying-in hospitals.

Sec. 1. [Definition of maternity boarding house or lying-in hospital; nurses.] Whoever for hire, gain or reward, receives, cares for, or treats within a period of six months, more than one woman during pregnancy, or during or after delivery, except women related by blood or marriage or whoever for hire, gain or reward has in his custody or control at any one time two or more infants under the age of two years, unattended by parents or guardians, for the purpose of providing them with care, food and lodging, except infants related to him by blood or marriage, shall be deemed to maintain a maternity boarding house or lying-in hospital. Provided, however, that nothing herein shall be construed to prevent a nurse from practicing her profession under the care of a physician in the home of a patient, or in a regular hospital other than a lying-in hospital. [O. L., v. 99, p. 13.]

Sec. 2. [Licenses; what contained in license; limit of number; inspection.] The state board of health shall have the power to grant licenses to maintain maternity boarding houses and lying-in hospitals. Every application therefor shall first be approved by the board of health of the city, village or township in which such maternity boarding house or lying-in hospital is to be maintained. Such license shall be granted for a term not exceeding one year, shall state the name of the licensee, the particular premises in which the business may be carried on, the number of women and infants that may be boarded, treated or maintained there at any one time, and, if required by the board of health of the city, village or township in which such maternity boarding house or lying-in hospital is located, it shall be posted in a conspicuous place on the licensed premises. No greater number of women and infants shall be kept at one time on the premises than is authorized by the license and no women or infants shall be kept in a building or place not designated in the license. A record of license issued shall be kept by the state board of health, which shall forthwith give notice to the board of health of the city, village or township in which the licensee resides of the granting of such license and of the terms thereof. The state board of health and the board of health of cities, villages or townships shall annually, and may, at any time visit and inspect or designate a person to visit and inspect premises so licensed. [O. L., v. 99, p. 13.]

Sec. 3. [Revocation of license.] The state board of health may revoke such license in its discretion where any provision of this act is violated, or in any case where in the opinion of the state board of health such maternity boarding house or lying-in hospital is being maintained without regard to the health, comfort or morality of the inmates thereof, or without due regard to sanitation and hygiene. The state board of health shall note such revocation upon the face of the record thereof and shall give written notice of such revocation to the licensee by delivering the notice to him in person or by leaving it on the licensed premises, and shall forthwith notify the board of health of such city, village or township in which such maternity boarding house or lying-in hospital is situated. [O. L., v. 99, p. 14.]

Sec. 4. [Reporting births.] Every birth which takes place in such maternity boarding house or lying-in hospital shall be attended by a legally qualified physician who shall forthwith report the fact of such birth to the board of health of the city, village or township in which such maternity boarding house or lying-in hospital is located. [O. L., v. 99, p. 14.]

Sec. 5. [Records to be kept; adopting children.] Every person holding such license shall keep a record in a form to be prescribed by the state board of health wherein he shall enter the name and address of the physician who attended at any birth which may take place in such house or hospital, or any infant who may be sick, and the name, age and sex of all children born on the premises or brought thereto, and also the name and age of every child who is given out, adopted, or taken away to or by any person, together with the name and residence of the person so adopting or taking away such children; and within twenty-four hours after such child is given out or taken away, shall cause a correct copy of the record relating thereto to be sent to the board of health of the city village or township wherein such house or hospital is located. [O. L., v. 99, p. 14.]

Sec. 6. [Notice in case of death; coroner's inquest; when necessary.] Every person licensed as aforesaid, shall immediately after the death of any inmate of such boarding house or lying-in hospital, whether a woman or an infant born therein or brought thereto, cause notice thereof to be given to the board of health of the city, village or township in which such house or hospital is located, and such board of health shall immediately call the coroner of the county in which said person died to hold an inquest on the body of such person, unless a certificate under the hand of a legally qualified physician is produced to said board of health by the licensee that such physician had personally attended and examined the person so dying, and also specifying the cause of death, and said board of health is satisfied that there is no ground for holding an inquest. [O. L., v. 99, p. 14.]

Sec. 7. [State board of health to furnish books for records.] Every license shall be entitled to receive gratuiously from the state board of health a book of forms for the registration and record of persons received into such home or hospital. The book shall contain a printed copy of this act. [O. L., v. 99, p. 15.]

Sec. 8. [Inspection.] It shall be lawful for the officers and authorized agents of the state board of health and the boards of health of the cities, villages or townships in which such licensed premises are located to inspect such house or hospital at any time and examine every part thereof, and to call for and examine the records which are required to be kept by the provisions of this act, and to inquire into all matters concerning such house or hospital and the inmates thereof, and it shall be the duty of the licensee to give all reasonable information to such persons making the inspection, and to afford them every reasonable facility for viewing and inspecting the premises and seeing the inmates thereof. [O. L., v. 99, p. 15.]

Sec. 9. [Adoption of children.] No child under two years of age, whether inmate of such house or hospital, or born therein or brought thereto, or otherwise, shall be given out for adoption, except by and with the consent of a charitable organization, society or institution having the care of children under its control duly incorporated under the laws of the state of Ohio, or juvenile court. [O. L., v. 99, p. 15.]

Sec. 10. [Placing child for hire, gain or reward.] No parent or guardian shall give to any person an infant under two years of age for the purpose of placing it for hire, gain or reward under the permanent care and control of another person; and no person, for hire, gain or reward, shall receive such infant for the purpose of placing it under the permanent care and control of another. The provisions of this section shall not apply to any charitable organization, society or institution, incorporated under the laws of the state of Ohio, or any of the officers or agents thereof. [O. L., v. 99, p. 15.]

Sec. 11. [Secrecy of records.] No officer or authorized agent of the state board of health or the boards of health of the cities, villages or townships where such licensed homes or hospitals are located, or any keeper of such house or hospital, shall divulge or disclose the contents of the records, or any of the particulars entered therein, except upon inquiry before a court of law, or at a coroner's inquest or before some other competent tribunal, or, in the case of such officer or authorized agent or keeper of such house or hospital for the information of the state board of health or the board of health of the city, village or township in which said house or hospital is located. [O. L., v. 99, p. 15.]

Sec. 12. [Offering inducements.] It shall be unlawful for any person licensed as herein provided, to advertise that he will adopt children, or to hold out inducements to parents to part with their offspring; and when such children are transferred by their parents, or are given out for adoption to other persons, such transfer shall be with the knowledge and consent of a chartiable organization, society or institution, duly incorporated under the laws of the state of Ohio, or juvenile court. [O. L., v. 99, p. 16.]

Sec. 13. [License.] No person shall maintain a maternity boarding house or lying-in hospital, as defined in section 1 of this act, unless licensed thereto by the state board of health. [O. L., v. 99, p. 16.]

Sec. 14. [Relationship.] In any prosecution under the provisions of this act, a defendant who relies for defense upon the relationship of any said women or infants to himself, shall have the burden of proof thereof. [O. L., v. 99, p. 16.]

Sec. 15. [Penalty.] Any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than three hundred ($300) dollars or by imprisonment for not more than one year, or both. [O. L., v. 99, p. 16.]

The Board, though favorable to this act, did not regard it as a distinctly health measure, and believed it should have been given to some one else to enforce.

An effort was made to register the location of all such institutions by sending a copy of the act to the Probate Judge of each county, to each county medical society, and to the health officer and chief of police of each city and village, with a request for such information.

The following rules and regulations for the government of maternity boarding houses and lying-in hospitals were adopted by the Board:

1. The rooms and wards in maternity boarding houses and lying-in hospitals shall be of sufficient size to allow not less than 1,000 cubic feet for each adult patient and of 500 cubic feet for each infant kept therein.

2. All rooms and wards shall be outside rooms, and the window space shall be not less than one-fifth the floor space.

3. The heating of all rooms shall be of sanitary type, and sufficient to maintain the temperature at 70 degrees Fahrenheit in the coldest weather.

4. The flooring and walls shall be in good condition, and of character to permit of easy cleaning. All parts of maternity boarding houses and lying-in hospitals shall be kept in a cleanly condition.

5. The plumbing and drainage, or other arrangements for the disposal of excreta and household wastes, shall be in accordance with the best sanitary practice. The water supply shall be pure.

6. Clean bedding, body linen and towels shall be kept on hand in sufficient quantity.

7. In each labor case, at the time of expected delivery, a legally qualified physician shall be promptly notified, and shall be present and in attendance at the time of birth.

8. After the birth of the child, a legally qualified physician shall be in attendance upon the mother and shall conduct all after treatment.

9. If the child is kept at the maternity boarding house or lying-in hospital, and is not breast-fed by its mother, the feeding and selection of food shalll be under the direction of a legally qualified physician. If a wet nurse is provided, she shall meet with the approval of such physician. Under no circumstances will the use of long-tubed nursing bottles be permitted.

10. A register, in book form, to be supplied by the State Board of Health, shall be kept, with all the data required by said Board, which data shall be entered in such register in ink within twenty-four (24) hours after the admission of any woman or child. Two exact copies of such entry shall be made in ink, on blanks furnished by the State Board of Health, and within twenty-four (24) hours after the admission of such person one copy shall be sent to the local board of health within whose jurisdiction such maternity house or lying-in hospital is situated, and the other copy to the State Board of Health, at Columbus, Ohio.

11. In case of the death of any inmate of any maternity boarding house or lying-in hospital, notice thereof, properly made out upon a form to be furnished by the State Board of Health, shall be at once sent to the board of health within whose jurisdiction such maternity boarding house or lying-in hospital is located, and a similar notice shall likewise be sent, and at the same time, to the State Board of Health, at Columbus, Ohio.

12. In case of adoption, giving out or taking away of a child or the discharge of any woman, from any maternity boarding house and lying-in hospital, notice thereof, properly made out upon forms to be furnished by the State Board of Health, shall be

sent to the local board of health within whose jurisdiction such maternity boarding house and lying-in hospital is located, and to the State Board of Health, Columbus, Ohio, within twenty-four (24) hours after the adoption, giving out or taking away or discharge of such inmate.

13. Any person maintaining a licensed maternity boarding house or lying-in hospital who violates or permits to be violated any of the above rules or regulations, or who violates or permits to be violated any provisions of an act to regulate the establishment, maintenance and inspection of maternity boarding houses and lying-in hospitals, passed February 17, 1908, shall have his or her license revoked.

Adopted by the State Board of Health, Septemper 5, 1908.

Dr. H. M. Platter of Columbus, who for many years had served as inspector of infectious diseases for the Columbus board of health, was appointed to look after these institutions under the general direction of the Secretary.

That the state should look after the welfare of these helpless abandoned children there can be no question. We have no means of knowing how many illegitimate children are born in Ohio each year, as our new system of registration of vital statistics is just getting under way. In our neighboring state of Pennsylvania there are more than 4,000 such births reported annually. There are of course many never reported.

Who will say that these unfortunate offspring of human "frailty" are not entitled to life and an opportunity for happiness? But we have evidence already that some of these maternity homes or "baby farms" are kept by the ignorant and vicious who have no regard for human life, and that babies left in their charge, unless payments are kept up (often not the case), are frequently thoughtlessly, if not deliberately, allowed to languish and die.

The state should stand in the relation of parent to every abandoned child. It is still a citizen of Ohio, and entitled to protection. Most of these infants that survive are looked after by charitable organizations, but it would be well to have a general law governing the care and disposal of all abandoned children.

HYGIENIC LABORATORIES.

A detailed account of the work of the Laboratories is set forth on a later page.

The Board was fortunate enough to secure as Chief of Laboratories Mr. Burt R. Rickards, S. B., who for many years had charge of the Laboratory of the Boston Board of Health.

The diagnostic work in the Laboratory continues to grow. During the past year there were 392 examinations made for suspected diphtheria, 1,255 examinations for suspected tuberculosis, 231 for suspected typhoid fever and 45 for suspected rabies. These examinations are made free of charge for any physician or health officer.

The Board has arranged to establish some 300 stations where physicians may obtain proper mailing outfits for sending specimens of infectious material by mail.

DISTRIBUTION OF ANTITOXIN.

A change has been made in the method of distributing diphtheria antitoxin for the treatment of indigent cases. It was found that with but one station at Columbus the antitoxin was too long in reaching the patient. We now have two to four distributing stations in each county, 263 in all. The antitoxin is furnished to the attending physician on the order of the local health authorities, who pay the producer. In eighteen counties it is paid for by the county commissioners under the provisions of an act passed February 25, 1908.

This arrangement, while an improvement over the old, still leaves much to be desired. The antitoxin is often still too far away from the physician in emergency cases (and antitoxin must be used early for its best results), and the local authorities are often slow in giving an order for cases that may be on the doubtful line as regards being indigent.

Antitoxin is now regarded as the most valuable means we have for preventing diphtheria by using it to immunize those exposed to the disease, and we may well consider whether the state would not be justified in furnishing it free for all cases, indigent or not. The Board is looking into the cost of producing antitoxin and may ask the next Legislature for authority and means to establish such a plant.

NUISANCES.

The Board has been called upon to investigate a number of complaints in regard to nuisances or unsanitary conditions of a general character. The following received personal attention and were the subject of special reports, which are omitted for lack of space. The local authorities were, however, furnished with copies of such reports, and were fully instructed as to the measures, legal or other, to be taken to remedy the evils complained of:

1. An investigation was made of unsanitary conditions at Perrysburg growing out of improper construction of sewers.
2. An inspection revealed a nuisance in the village of Leipsic caused by permitting sanitary drainage to enter a storm water sewer not intended for such use.
3. An investigation of sewerage conditions in Mt. Gilead showed that improperly constructed sewers were causing a nuisance, and that plans for proposed additional sewerage were not calculated to remove the nuisance, but rather to increase it.
4. The complaint that a nuisance was caused by the discharge of water closets and creamery wastes into a small stream in the village of Andover was investigated, and found to be well founded.
5. An investigation was made of the sanitary conditions in the village of Shawnee. These were shown to be very bad from various causes, which were pointed out in the report.

6. An investigation of unsanitary conditions complained of in the village of Spencerville showed that the only possible relief is the construction of sewers, and that sewage purification would be necessary.

7. A complaint was investigated of the pollution of Alum Creek by sewage from the St. Mary's of the Springs Academy near Columbus.

8. The complaint was investigated of unsanitary conditions at Blanchester caused by the use of a storm water drain for the removal of domestic sewage. As stated above, these matters were all taken up with the proper local authorities and the proper remedies suggested for the conditions complained of.

MEETINGS.

Four regular and four special meetings of the Board were held during the year. The January meeting was held in Columbus in conjunction with the health officers and members of boards of health of cities and villages of over 3,000 inhabitants. In June the Board met with the health authorities of townships and villages of less than 3,000 inhabitants in the northern half of the state, and a similar meeting for such health authorities in the southern half of the state was held in October, in Dayton. Appropriate programs were presented at these meetings, with discussions of various subjects related to the public health. The proceedings were printed and distributed.

The year closes with bright propects for the future. The Board's work is becoming better known and better appreciated. Health and sanitation are receiving much greater public and private attention. The people are just beginning to realize what they have only half known before: That the state of the public health, like that of the individual, may be enhanced or debased by sins of both commission and omission. Pursuing wealth has been our chief occupation. Many have found it at the sacrifice of health, and have learned too late that they had sold their birthright for a mess of pottage.

Health, full, joyous, vigorous health, is bound to be finally regarded as the thing in life most worth striving for, and as the path that leads to earth's other choicest blessings, both temporal and spiritual.

MINUTES OF THE SECRETARY

JANUARY MEETING

A regular meeting of the State Board of Health was held in the Office of the Secretary, on the evening of January 22, 1908.

There were present Drs. Stanton, Chapman, Warner and Crossland.

The Board was called to order by Dr. Stanton.

Representatives from the public service committee of council and from the board of public service of New Philadelphia were present and requested the Board to modify conditions of approval for a system of sewerage for that village.

Mr. E. A. Dye, superintendent of the Girls' Industrial Home at Delaware, by invitation appeared before the Board, and the Secretary presented a report relative to diphtheria at the Home, which he had previously made to the board of trustees of that institution. He explained that he and Dr. Warner had visited the Home the day before and believed it to be feasible to carry out the suggestions made to the trustees for getting rid of the disease. Mr. Dye stated that the trustees and he were anxious to follow any suggestions that might be made by the State Board of Health, and that they would do all in their power to do so. He said that he would bring the matter to the attention of the legislature and ask for sufficient appropriation to carry out the plan suggested by the Secretary if that should meet the approval of the State Board of Health.

The report to the trustees as follows was then read by the Secretary:

COLUMBUS, OHIO, January 14, 1908.

To the Board of Trustees, Girls' Industrial Home, Delaware, Ohio.

DEAR SIRS:—The continued presence of diphtheria at the Girls' Industrial Home has led to a recent investigation to determine, if possible, the cause thereof.

The disease began in January, 1906, and, with short intermissions, has continued to the present time. The total number of cases to date is 125. Only one death occurred, which was from heart failure after recovery from the disease.

The disease, however, has been somewhat severe in character, and loss of life has only been prevented, I think, by the early and intelligent use of antitoxin.

Up to this time everything possible, apparently, has been done to eradicate the disease. Failure has been due, as I now regard it, to the wide dissemination of diphtheria germs and the presence of a large and unknown number of healthy persons who are carrying diphtheria bacilli around in their throats.

In submitting a tentative plan for eradicating diphtheria from the Home, the following points are to be considered:

The accepted view of diphtheria is that it is always caused by a specific germ, which usually grows in the throat or nose or both. The disease is ordinarily communicated by direct contact with persons or things infected with this germ. Books, pencils, chewing gum, drinking utensils, and like articles are contaminated by the mouth and fingers of one having diphtheria germs in his throat or nose, and in various ways these germs may then be transferred to the throat or nose of some other person.

In a perfectly normal throat or nose of a healthy individual, this germ may lodge, multiply and maintain an active existence for a considerable time without producing diphtheria, or disease symptoms of any kind. On the other hand individuals, especially children, suffering from simple sore throat are especially liable to contract diphtheria when exposed to that disease. In an institution, especially when over-crowded, sore throats are common, thus favoring the spread of diphtheria when once introduced.

Even in private families, when a case of diphtheria occurs, other members of the family, especially those in contact with the patient, are not infrequently found with diphtheria germs in their throats, though they may show no signs of the disease and remain perfectly well. This is very much more apt to occur under the conditions of institutional life. Such is now the situation at the Girls' Industrial Home.

On January 6, 1908, the bacteriologist of the State Board of Health visited the Home and took swabbings from 37 inmates, 3 of whom were attendants. Diphtheria bacilli were found in the mouths or throats of 30, or 81 per cent. A considerable number of these showed no signs of disease, and 10 of them had had diphtheria from one to four months previously.

To verify these findings, which seemed of very serious import, the bacteriologist visited the Home again on January 11th. He examined the throats of 23 persons. Only some 3 of these, so far as known, were in direct contact with diphtheria cases, and the others were not more exposed to the germs of the disease than practically all other inmates of the institution.

Of the 23 examined 9, or 38.9 per cent., were carrying active diphtheria germs in the throat or nose, and this in spite of the fact that antiseptic gargles and sprays for their destruction had been used in all cases.

With such widespread opportunities for infection as these examinations seem to indicate, only the most radical measures can be relied upon to free the institution from this disease.

As a basis for a working plan I would suggest the following:

EQUIPMENT.

1. Hospital A for all known cases of diphtheria.
2. Hospital B for all cases of suspected sore throat.
3. Cottage 1 for inmates and their attendants who are not ill, but who have diphtheria germs in their throats or noses. (I call this Cottage 1 for convenience in reference. It may require two or three cottages for this class.)
4. Three disinfected cottages (2, 3, and 4) for all inmates and attendants who are not ill and who have no germs of diphtheria in their throat or nose.
5. Disinfected, open cottage (5,6,7 and 8) for all those who have passed successfully through the three cottages provided for above, and who, after three examinations of their throats and noses, are found free from diphtheria germs.
6. A laboratory at the Home.
7. A steam sterilizing plant.
8. A competent bacteriologist to act with the physician in charge.

OPERATION.

1. A careful clinical examination of all persons at the Home for positive or suspicious cases of diphtheria. Positive cases to be sent to Hospital A, suspicious cases to Hospital B.
2. A bacteriological examination of the throats and noses of all persons at the Home, taken cottage by cottage. Send all inmates and others who are obliged to be in direct contact with them, and who are bacilli carriers, to Cottage 1. Send all others of this class who are free from bacilli, and who have no sore throat, to Cottage 2.
3. After 24 hours examine all in Cottages 1 and 2 for diphtheria germs. Send those bacilli free to Cottage 3. Send any in Cottage 2 with bacilli back to Cottage 1.
4. Again, after 24 hours, examine all in Cottages 1 and 3 for diphtheria bacilli. Send all those bacilli free to Cottage 4, and any in Cottage 3 with bacilli back to Cottage 1.
5. Again, after 24 hours, examine all in Cottages 1 and 4 for diphtheria bacilli. Send all who are bacilli free to the "open cottages" 5 and 6. Send any found in Cottage 4 with diphtheria bacilli back to Cottage 1.

This routine would be kept up until all inmates, and others who come in direct contact with them, have passed through Cottages 2, 3 and 4, ("filter cottages" we might call them) to the open Cottages 5 and 6.

Before sending any one to Cottage 2, her person and clothing are to be thoroughly disinfected.

Inmates of Cottages 2, 3 and 4 are to have careful supervision, to prevent so far as possible opportunities for communicating infection by bacilli carriers who may happen to gain admittance.

Fully protect bacilli free and open cottages (i. e., Cottages 2, 3, 4, 5 and 6) against the introduction of infection by persons or things going in.

Antiseptic gargles and sprays are to be frequently used in the throats and noses of bacilli carriers in Cottage 1.

Pay special attention to the protection against infection of all food, milk, tableware, et cetera.

The bedding, clothing, etc., of all diphtheria cases and suspected cases, and of all bacilli carriers, to be properly disinfected.

Bacilli carriers among employes who are not sick and who do not have to come in direct contact with inmates, need not be quarantined, but are to remain upon the premises. They should have daily sprays and gargles, and not be allowed to handle anything going into cottages 2, 3, 4, 5 and 6 that cannot first be properly disinfected.

This plan is to be persistently followed until no person at the institution shows the presence of diphtheria germs in throat or nose after three bacteriological examinations.

If some such plan, or one equally radical, is not followed, I do not believe it will be possible to rid the Home of diphtheria; for it is to be remembered that, unlike most diseases of this class, one attack of diphtheria does not protect against a second attack.

While all the inmates have been recently immunized, we cannot count on this immunity lasting longer than three weeks. Our experience shows that the germs of diphtheria will remain in the throats of bacilli carriers much longer than this, which would mean a renewal of infection unless these can be kept separate from all others a sufficient length of time to free their throats from this organism. How long this would be I am unable to state, but it would probably be a matter of months.

Very respectfully,

C. O. PROBST,
Secretary.

On motion of Dr. Crossland, seconded by Dr. Chapman, it was voted to adopt and recommend the plan proposed by the Secretary for the eradication of diphtheria at the Home.

Mr. D. M. Hine, an attorney from Newton Falls, appeared before the Board with plans for a proposed water supply and sewerage system for that village.

Mr. Thomas B. Webb, sanitary policeman of Warren, and Mr. John P. Webster, sanitary policeman of Cleveland, addressed the Board on the subject of Senate Bill No. 346, now pending, providing for placing sanitary policemen under civil service.

The mayor and city engineer of Niles, and Mr. E. G. Bradbury, consulting engineer, of Columbus, presented plans for a sewage disposal plant for Niles.

These matters were referred to executive session.

Later, in executive session, the question presented by the delegation from New Philadelphia was taken up for consideration.

On motion of Dr. Warner this was referred to the Secretary for investigation.

The plans for water supply and sewerage system for Newton Falls, which were really not plans, but a mere sketch showing local conditions, were, on motion of Dr. Chapman, referred to the chief engineer for investigation and further information.

On motion of Dr. Chapman, as it was stated that some changes were contemplated in Senate Bill No. 346, the Board voted to defer action.

On motion of Dr. Crossland, plans for sewage disposal for Niles were referred to the chief engineer for investigation and report.

The minutes of the last meeting were read and approved.

The Secretary read his report, which was ordered filed for printing.

A report of the chief engineer on a proposed water filtration plant for the city of Ashtabula was presented by the Secretary.

It was moved by Dr. Warner, and seconded by Dr. Crossland, to approve the plans as submitted by Messrs. Chapin and Knowles, consulting engineers, on January 21, 1908, upon the following conditions:

1st. That the management and operation of the plant, including the quality and amount of coagulant used, be at all times satisfactory to the State Board of Health; and

2d. That the valve controlling the emergency intake be kept locked, and that the key to said valve be placed in a box with a glass front, the box to be fastened in a suitable place at the pumping station, and that this box be provided with a lock and one key only, this key to be kept by the health officer of the city.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

The Secretary read a letter from the mayor of Ashtabula, stating that some changes were being made in their sewer districts, and asking the Board to defer action upon plans already submitted for Sewer District No. 3 in that city.

The Chair stated that no action would be necessary.

The Secretary presented a report of the chief engineer on a proposed system of sewage purification for the village of Kent.

It was moved by Dr. Chapman, and seconded by Dr. Warner, to approve the plans for sewage purification for Kent, as shown on drawings submitted by Messrs. Chapin and Knowles, consulting engnieers, December 12, 1907, upon the following conditions:

1st. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2d. That detailed plans of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health before these are installed;

3d. That an area of sand filters, as shown on plans, be constructed whenever deemed necessary in the future by the State Board of Health;

4th. That the sewage purification works, as shown on plans now submitted, be constructed before any of the proposed new sewers are placed in service; and

5th. That the operation and management of the plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

It was moved by Dr. Crossland, and seconded by Dr. Chapman, that the Board appoint Dr. Lewis E. Deuble health officer of the village of Miller City, to serve in lieu of a board of health for a term of one year and at a salary of $3.00 per month.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

The Secretary presented a plan for a systematic investigation of disposing of city wastes. It was suggested that twelve of our largest cities which have introduced either cremation or reduction plants be selected, and that monthly tests of the cremation plants and careful examinations of the operations of the reduction plants be carried on for a period of one year. In the tests on the cremation plants it is hoped to derive the following data: Quantity and character of material burned; quantity and character of ash produced; quantity and kind of fuel used; temperature measurements in various parts of furnace; analytical determinations of chimney draft; notes on labor involved; cost data.

During the monthly visits to the reduction plants it is hoped to include accurate notes on the following: Quantity and character of material treated; quantity and quality of grease produced; quantity and quality of tankage produced; kind and quality of fuel used under boilers; labor required; cost data.

The investigation would also include an inspection of plants in other cities, and a study of methods of wastes disposal in European countries so far as this can be made through the medium of books, papers, reports and correspondence.

The Board voted to approve this plan, subject to an appropriation by the Legislature to enable it to carry on this expert work.

Matters previously acted upon by mail were then taken up for confirmation.

It was moved by Dr. Chapman, and seconded by Dr. Crossland, to confirm the Board's action of November 6, 1907, approving plans for sewerage and sewage purification for New Philadelphia, as shown on drawings and described in specifications submitted by Paul R. Murray of that city and E. G. Bradbury of Columbus, on October 14, 1907, provided:

1st. That the sewage purification works be built before any of the new sewers are placed in use; and

2d. That the operation and management of the plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

It was moved by Dr. Chapman, and seconded by Dr. Crossland, to confirm the Board's action of November 6, 1907, approving plans for a proposed water filtration plant for the city of Sandusky, as shown on drawings submitted by William Ohlemacher, president of the board of public service, September 16, 1907, upon the following conditions:

1. That the operation of the plant, including the kind and amount of coagulant used, be at all times satisfactory to the State Board of Health;
2. That a storage capacity for filtered water of at least 800,000 gallons be provided before the plant is placed in operation;
3. That sample of strainer to be used be submitted to and receive the approval of the State Board of Health before the strainers are placed;
4. That samples of the filtering material and specifications therefor be submitted to and receive the approval of the State Board of Health before this is placed;
5. That there be submitted for approval detailed drawings showing method to be used to create equal flow through sedimentation basins and to maintain the same level in both basins;
6. That there be submitted detailed plans and description of laboratory.
7. That there be submitted detailed drawings showing method of making walls of clear well water-tight.
8. That there be submitted full detailed plans showing how strainer system is to be installed;
9. That the re-wash valve be arranged so that it can be opened and closed from the operating floor.
10. That automatic rate controllers, as shown on plans submitted or of other design satisfactory to the State Board of Health, be installed before the plant is placed in operation;
11. That loss of head gages be installed before the plant is placed in operation;

12. That the valve which controls the admission of unfiltered water to the distribution system be placed under lock and key kept in possession of the health officer, and that unfiltered water shall be used only in times of emergency and with his knowledge; and

13. That the plant be constructed under the immediate supervision of an inspector, representing the board of public service and the city engineer, experienced in matters relating to the construction of filtration plants.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

It was moved by Dr. Warner, and seconded by Dr. Crossland, to confirm the Board's action of January 8, 1908, approving a new water supply for the city of Lancaster, using land adjoining the old pumping station on the north side of Wheeling Street immediately west of the old canal bed, for water supply purposes, provided that all wells located thereon be cased to a depth of at least 70 feet, and that no source of pollution which in the opinion of the State Board of Health would affect the quality of the water be allowed within 500 feet of any well.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

It was moved by Dr. Crossland, and seconded by Dr. Chapman, to confirm the Board's action of January 9, 1908, approving plans and specifications for a sewage purification plant for the Methodist Home for the Aged, at College Hill, Ohio, submitted by Samuel Hannaford & Sons, architects of Cincinnati, on December 27, 1907, provided:

1. That the detailed design of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health before the nozzles are placed.

2. That the bottom eighteen inches of stone filters consist of pieces of stone from 2.5 inches to five inches in diameter; that the bottom layer of the sand filters consist of one foot of gravel, and that the samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed; and

3. That the plant when constructed be at all times operated in a manner satisfactory to the State Board of Health, and that it be enlarged when deemed necessary by said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Chapman to confirm the Board's action of November 4, 1907, appointing H. H. Prince health officer of the village of Canal Dover (Dover P. O.) to serve in lieu of a board of health until the second Monday in January, 1909, at a salary of $15.00 per month.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner and Crossland.

In the negative, none.

The Board then adjourned to the call of the President.

Attest: C. O. PROBST,
Secretary.

APRIL MEETING

A regular meeting of the State Board of Health was held at the office of the Secretary on the evening of April 22, 1908.

There were present Drs. Palmer, Stanton, Crossland, Warner, Chapman and Mr. Hartzell.

Mr. Eugene Adler, member of the House of Representatives from Cincinnati, spoke to the Board about the new law requiring the State Board of Health to inspect and license maternity hospitals.

The minutes of the last meeting were read and approved.

The Secretary presented his report, which was ordered filed for publication.

On motion of Dr. Chapman it was voted to hold a special meeting in Toledo some time in May, after the adjournment of the Legislature.

On motion of Dr. Stanton, it was voted to hold the June meeting of the Board at the Hollenden Hotel, in Cleveland, on the 17th, and to authorize the President and Secretary to arrange a program for the conference with local boards of health of the northern district, to be held on June 18th and 19th.

The Secretary presented a report of the chief engineer of his investigation relative to the reconsideration of proposed sewerage for the village of New Philadelphia, and also the following communication from the council of that village:

New Philadelphia, Ohio, April 17th, 1908.

The State Board of Health, Columbus, Ohio.

Dear Sirs:—The condition of the sewer question and the state of the finances of our little city are known to you. You were informed at your February meeting by a committee of council, who visited you at that time, and through your consulting engineer, Mr. Pratt, who has recently visited our city.

Mr. Murray was employed to make plans for sewer for our city. This he did, and submitted same to you for your approval before the council knew what said plans were.

Said plans call for a disposal plant, which it is utterly impossible for us to build at present, and as three-fourths of our city is not sewered, and as the health and prosperity of our city depends upon the immediate construction of a system of sewerage, therefore we beseech you that you permit a modification of said plans, by permitting the sewage to be emptied into the Tuscarawas River at a convenient place below the present mouth of the old sewer and near to where the disposal plant is to be located, until such time as your Board shall see fit to order the city to erect a disposal plant; or until such time as Massillon, 25 miles above, Canal Dover, 3 miles above, and Uhrichsville and Dennison, 19 miles below, who at present empty their sewage into the Tuscarawas, are also required to build disposal plants.

Again beseeching you to grant this, our earnest request, we are,

Most respectfully yours,

City Council, New Philadelphia, Ohio.
Per John Emerson, President.
A. V. Keplinger, Clerk.

We Councilmen approve above petition:

D. D. Swihart.
Fred Graff.
Simon H. Darst.
O. F. Bash.
R. T. Horning.

It was moved by Mr. Hartzell, and seconded by Dr. Stanton, that the following action be taken:

(1) The present outlet into the Tuscarawas River near the foot of First Street, plans for which were never submitted to the State Board of Health for approval as required by law, and which outlet is now the cause of offensive conditions in the river, is disapproved; and

(2) Permission to construct the proposed main sewer and to omit the purification works is refused, but the city is permitted to construct the main sewer and sewage purification works as approved, omitting the eight southerly filters for the present; provided, however, that additional filters be constructed and placed in use as and whenever deemed necessary by the State Board of Health.

It should be understood that permission to amend the plans in this way does not in any other particular change the action of the Board on the proposed plans, as set forth in its letter of approval of November 6, 1907, to the board of public service of New Philadelphia.

Those voting in the affirmative were Drs. Palmer, Stanton, Crossland, Warner, Chapman and Mr. Hartzell.

In the negative, none.

The Secretary presented plans for proposed sewers in District No. 6, and for a sewer in Plymouth Street, Bucyrus, submitted by the city engineer, Mr. C. A. Guiss, September 18, 1907, and April 7, 1908, with a report by an engineer of the Board upon said plans.

It was moved by Mr. Hartzell, and seconded by Dr. Chapman, that these plans be disapproved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to notify the board of public service of Bucyrus that it was the opinion of the Board that steps should be taken toward remodeling the present system of sewers and for the construction of a satisfactory sewage purification plant for that city.

The Secretary presented a report of an investigation of the water filtration plant at Bucyrus. It was shown in this report that the conditions of the Board's approval of the plant had not been complied with.

On motion of Mr. Hartzell, seconded by Dr. Chapman, the Secretary was instructed to send the following communication to the superintendent of water works:

Columbus, Ohio, April 24th, 1908.

Mr. Henry Diedrich, Superintendent of Waterworks, Bucyrus, Ohio.

DEAR SIR:- At a meeting of the State Board of Health, held in Columbus on April 22, 1908, a report of an investigation of your water filtration plant, made April 15, 1908, by one of the Board's engineers, was presented. It appears from this report that the conditions of the Board's approval of your water filtration plant have not been complied with.

I was instructed to inform you that the Board would expect you within two months from this date to make those changes in your filtration plant which were fully set forth in my communication to you under date of March 7, 1907, to which you will please refer.

Yours truly,

C. O. Probst,
By order of the Board. Secretary.

Mr. H. E. Riggs, of The Riggs & Sherman Company, of Toledo, presented plans for a sewerage system for the village of Sylvania.

The Secretary was instructed to refer these plans to the chief engineer for investigation and report.

The Secretary presented detailed and revised plans for the water purification plant for the village of Jefferson, submitted April 11, 1908, by Mr. L. E. Chapin, consulting engineer, in order to fulfill conditions 2 and 3 of the Board's approval of plans in June, 1907. He also presented a report by the chief engineer.

On motion of Mr. Hartzell, seconded by Dr. Chapman, it was voted to approve these plans, provided:

1st. That the management and operation of the plant, the use of the coagulant and the rate of filtration be at all times satisfactory to the State Board of Health; and

2d. That the loss of head gages be placed at the outlets of the filters when the plant is constructed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

The Secretary presented a communication from the Surgeon-General of Public Health and Marine Hospital Service, calling a conference of state boards of health at Washington, D. C., on April 27, 1908, for the consideration of rules and regulations governing interstate quarantine, and certain bills pending in Congress affecting the public health and Marine Hospital Service.

On motion of Dr. Stanton, seconded by Mr. Hartzell, the President and Secretary were appointed to represent the Board at this conference.

The Secretary called attention to the importance of various health bills prepared by the Board and passed by the General Assembly.

On motion of Dr. Warner, seconded by Dr. Stanton, he was instructed to extend the Board's sincere thanks to the following members of the 77th General Assembly, who introduced these bills and were instrumental in securing their passage, to-wit:

Hon. Carl L. Braun, House Bill No. 745, providing for county hospitals for tuberculosis.

Hon. Edgar Ervin, House Bill No. 799, regulating the state sanatorium.

Hon. Samuel H. West, Senate Bill No. 467, establishing a system of vital statistics.

Hon. W. E. Bense, House Bill No. 699, to prevent the pollution of streams.

Hon. Noah J. Dever, House Bill No. 1268, amending the act establishing the State Board of Health.

Hon. George White, House Joint Resolution No. 86, creating a commission to investigate Ohio River pollution; and

Hon. Milton E. Rathburn, Senate Joint Resolution No. 57, memorializing Congress for a national bureau of health.

The Secretary presented a list of health officers serving in lieu of a board of health who had adopted the order recommended by the Board for supplying antitoxin, said order reading as follows:

AN ORDER.

Of the Health Officer to provide for supplying antitoxin free to indigent persons suffering from or exposed to diphtheria.

Section 1. For the protection of the public health, it is hereby ordered by the Health Officer that any indigent person in or residing within its jurisdiction who is suffering from diphtheria, or who has been exposed to such disease, will, upon the request of his or her attending physician, be furnished with antitoxin at the expense of said Board of Health, in such amount as the attending physician may deem necessary.

Section 2. This order shall take effect and be in force on and after its adoption and legal publication.

Matters previously acted upon by mail were taken up for confirmation.

It was moved by Dr. Stanton, and seconded by Mr. Hartzell, to confirm the Board's action of February 18, 1908, approving a scheme to secure a public water supply for Newton Falls from the west branch of the Mahoning River at a point above the village, as presented by the village solicitor, Mr. D. M. Hine, at the meeting of the Board on January 22, 1908, provided the water first be purified by a filtration plant of a design to be approved by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to notify the authorities that the Board recommended that they make investigations for the purpose of determining whether or not a suitable ground water supply could be obtained before taking water from the river.

It was moved by Dr. Chapman, and seconded by Dr. Stanton, to confirm the Board's action of February 18, 1908, approving a proposed sewer for Newton Falls, as shown on drawings submitted to the Board at its meeting held January 22, 1908, by Mr. D. M. Hine, village solicitor, provided council pass an ordinance prohibiting the use of the sewer for house connections or domestic purposes of any kind, and restricting its use to surface and ground water drainage only.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Warner, and seconded by Dr. Crossland, to confirm the Board's action of March 2, 1908, approving a tract of land comprised in the William Orr, Mead, Bevington and Saurer farms, for obtaining an additional water supply for Orrville, provided the village secure such control of this and adjoining land that no possible source of pollution will be permitted within 500 feet of any well.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

The Secretary was authorized to notify the authorities that the Board advised that similar precautions be taken for protecting the existing supply, although this supply is at the present time safe; and that all privies within the vicinity of the present wells should be reconstructed in such a manner that the soil cannot become polluted.

Also that the Board advised that more complete tests of the wells for quantity of water available be made before developing them further; and that complete plans showing the location of each well, boundaries of land controlled by the village, pumping station, and pipe lines, should be submitted to the State Board of Health before construction of the works is begun.

It was moved by Dr. Crossland and seconded by Mr. Hartzell to confirm the Board's action, March 27th, 1908, approving a sample of sand to be used in the sewage purification plant at Orrville, submitted in accordance with condition 3 of the Board's approval of plans, September 24th, 1907.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the Board's action, March 2d, 1908, approving a proposed sewer in South Street, Steubenville, in accordance with plan drawn by Mr. S. B. Curfman, former city engineer, and submitted February 3d, 1908, by Mr. J. N. Leech, city engineer of Steubenville, provided the outlet be so constructed that the dry weather flow will be discharged below the lowest water level in the river at all times.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's action of March 9th, 1908, approving plan showing proposed sewerage for Sewer District No. 3, Ashtabula, submitted by Mr. Lewis A. Amsden, city engineer, December 3d, 1907, provided:

1st. That the city within three years present plans to the State Board of Health for approval, providing for the purification of the sewage from the entire city; and, 2nd. That approved plans be carried out, and sewage purification works placed in satisfactory operation within five years from this date

Those voting in the affirmative were Messrs. Stanton, Chapman Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Warner to confirm the Board's action of March 9th, 1908, approving a combined sewer for the village of Mingo Junction, which is to discharge into the Ohio River 600 feet below the water works intake, as shown on plan submitted February 14th, 1908, by Mr. Frank McLister, village clerk; and disapproving the outlets, shown on the above mentioned drawing, which it is proposed to locate above the water works intake.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to notify the authorities that for the reason that the village may be called upon at some future date to purify its sewage, the Board is of the opinion that it would be very desirable and more economical to construct a separate system of sewers; one set of sewers for domestic sewage and one for storm water, instead of the very large main sewer now proposed. That by adopting the separate system, the sewers for the domestic sewage would be very much smaller than the combined sewers now proposed; and it is believed that the storm sewers could by this plan be made shorter in length and of smaller diameter than the combined sewers now proposed.

It was moved by Dr. Warner and seconded by Dr. Crossland to confirm the Board's action of March 28th, 1908, approving an amended plan for proposed sewerage for Mingo Junction, submitted March 20th, 1908, which provides for a separate system of sewers in District No. 2, the domestic sewage to be conveyed to the outlet already approved by the State Board of Health, below the water works intake; and the proposed surface water sewer to discharge as shown on the original plan; upon the condition that council pass an ordinance prohibiting the use of the proposed storm sewers for house drainage of any kind, and that a certified copy of such ordinance be filed with the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Crossland and seconded by Mr. Hartzell to confirm the Board's action of March 21st, 1908, approving plans for a sewage purification plant for Niles, as shown on drawings submitted January 20th, 1908, by Messrs. E. G. Bradbury and George P. Shute, consulting engineers, and prepared in co-operation with Mr. William Wilson, city engineer, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That detailed drawings of the controlling devices be submitted to and receive the approval of the State Board of Health;

3rd. That plans of the pumping station, when prepared, be submitted to and receive the approval of the State Board of Health; and,

4th. That provision be made for future installation of basins in which to disinfect the final effluent.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Stanton to confirm the Board's action of April 3rd, 1908, approving plans for enlargement of the Delaware sewage disposal works, as shown on drawings submitted March 7th, 1908, and amended March 31st, 1908, by Mr. J. S. Dyke, civil engineer acting for the city, in consultation with Messrs. E G. Bradbury and George P. Shute of Columbus, provided the management and operation of the plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's action of April 3rd, 1908, approving plans for sewerage and sewage purification for Hartwell, as shown on drawings submitted March 13th, 1908, by The Riggs and Sherman Company of Toledo, consulting engineers, provided:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use;

2nd. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters, and that the proper thickness of each grade of material be determined by the State Board of Health when the quality of the material is examined;

3rd. That detailed drawings showing the plant as it will be when completed and ready for operation, including the controlling apparatus, be submitted to and receive the approval of the State Board of Health before being finally approved; and,

4th. That the management and operation of the plant be at all times satisfactory to the State Board of Health, and that the plant be enlarged when deemed necessary by said Board.

Also approving the scheme of omitting the construction of the septic tanks for the present; detailed drawings to be submitted before the tanks are constructed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Warner to confirm the Board's action of March 28th, 1908, approving sample of stone for the sprinkling filter, and of sand for use in the sand filters, at the Methodist Home for the Aged at College Hill, submitted by the President of the Home, Dr. H. C. Weakley, in compliance with condition 2 under which the plans were approved January 9th, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Chapman to confirm the Board's action of April 11th, 1908, approving a plan for a proposed sewerage system for Struthers, as shown on drawing submitted April 7th, 1908, by George M. Montgomery, civil engineer for the village, with the understanding that the village shall be called upon to install a sewage purification plant, of a design satisfactory to the State Board of Health, whenever this is deemed necessary by said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Crossland and seconded by Mr. Hartzell to confirm the Board's action of February 10th, 1908, amending its Rules and Regulations for the Prevention of Smallpox to read as follows:

RULES AND REGULATIONS OF THE OHIO STATE BOARD OF HEALTH FOR THE PREVENTION OF SMALLPOX

I. Physicians called to attend persons suffering from smallpox, varioloid (modified smallpox), ar chickenpox, shall report the fact within 12 hours to the Board of Health within whose jurisdiction such persons are found, giving their names and addresses.

II. When there is good reason to suspect the existence of smallpox in any house or place from a report other than from a physician, it shall be the duty of the Board of Health to at once make an investigation, by sending a physician to examine and report upon suspected cases.

III. In the case of smallpox or varioloid it shall be the duty of the Board of Health receiving such report to at once placard the house in which the patient resides or is found, announcing in large letters the existence of SMALLPOX WITHIN, which placard shall not be removed until after recovery of the patient and disinfection of the house; or the Board may remove the patient to an infectious disease hospital, disinfect the house and contents, and quarantine the inmates who are not protected against smallpox by a previous attack of the disease, or by recent successful vaccination, for 17 days from the completion of such disinfection. Or such inmates, after vaccination, may be kept under a "quarantine of observation" as noted in Rule VIII.

IV. In the case of chickenpox it shall be the duty of the Board of Health to at once placard the house in which the patient resides or is found, announcing in large letters the existence of CHICKENPOX WITHIN, which placard shall not be removed until after the recovery of the patient.

V. In smallpox a quarantine notice shall be served upon the head of the household forbidding any one to enter or leave the premises except the attending physician or other person authorized by the Board of Health.

VI. It shall be the duty of the local Board of Health to strictly enforce this order, which shall be done by placing a day and night guard over quarantined houses whenever necessary.

VII. All persons unprotected against smallpox by a former attack of the disease, or by recent successful vaccination, known to have been exposed to a person suffering from smallpox in the eruptive stage of the disease, shall be quarantined for 17 days from the time of last exposure, and be vaccinated; or such quarantine may consist of a "qurantine of observation" as described in the following rule. (Rule VIII.)

VIII. After vaccination and the disinfection of the clothing worn at time of exposure, such exposed persons, if not remaining in the house with the smallpox patient or in any way exposed to smallpox after such disinfection, may be given their liberty and kept under a quarantine of observation; that is, they must be examined by a physician, who must take the temperature daily for seventeen (17) days from the time of last exposure. Any person who, during this period of observation, shows fever or any symptom suspicious of smallpox, must be promptly isolated until the true nature of his disease can be determined.

IX. Quarantine of smallpox patients shall be maintained until they have completely desquamated or scaled off, as certified by a reputable physician, and until the house and its contents have been properly disinfected under the supervision of the Board of Health. Persons in the house with the patient who are not protected against smallpox by a recent successful vaccination or a former attack of the disease, shall be quarantined for 17 days from the time disinfection of the house is completed.

X. Persons who have recently recovered from smallpox, or suspected smallpox, the nature of their malady not having been known or recognized at the time of their illness, shall be returned to their homes until their dwellings and contents, including the clothing of all the inmates, are properly disinfected under the supervision of the Board of Health.

XI. No child in a community in which smallpox actually exists shall be permitted to attend any public, parochial or private school without presenting satisfactory evidence of having been successfully vaccinated.

XII. It shall be the duty of the local Board of Health or its health officer receiving a report of a case of smallpox within the jurisdiction of such Board to at once report the case, by telegram or telephone when possible, to the State Board of Health. After such telegraph or telephone notice is given, health officers or clerks of boards of health shall make weekly detailed report of all cases and deaths occurring during the week. These reports shall be made on the blanks furnished by the State Board of Health for the purpose.

XIII. The Secretary of the State Board of Health, as its Executive Officer, is hereby authorized and directed to secure the strict enforcement of the above rules and regulations, with such modifications thereof and such additions thereto as the exigencies of any particular case may demand.

Adopted November 29, 1898.
Amended October 18, 1899.
Amended February 10, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland and Hartzell.

In the negative, none.

There being no further business, the Board adjourned.

Attest: C. O. PROBST,
Secretary.

MAY, SPECIAL MEETING

A special meeting of the State Board of Health was held at the Boody House, in Toledo, May 14th, 1908, at 2:30 p. m.

All members were present except Dr. Warner.

The first matter to be considered was the Adler Act, requiring the State Board of Health to inspect and license maternity boarding houses and lying-in hospitals. The Secretary read the act.

The question was raised as to whether in Section 4, a midwife would be prohibited from attending a lying-in case in a maternity boarding house or lying-in hospital.

On motion of Dr. Chapman, the Secretary was instructed to request the Attorney-General to give an opinion upon this point.

The Secretary suggested that rules and regulations might be adopted by the Board, governing maternity boarding houses and lying-in hospitals, by the enforcement of which places manifestly unfit for such purposes could be closed by the Board's refusing to grant the proprietors thereof a license.

In line with this suggestion, he presented a set of rules and regulations for the government of maternity boarding houses and lying-in hospitals.

After some discussion in regard to the appointment of one or more inspectors to enforce the Adler Act, and the salaries that should be paid to such inspectors, it was moved by Dr. Miller and seconded by Dr. Crossland, that a committee of three be appointed with authority to appoint one or more inspectors and to fix their salaries.

The Chair appointed on this committee, Drs. Probst, Miller and Crossland.

On motion of Dr. Stanton, it was voted to refer the rules and regulations submitted by the Secretary, for the government of maternity boarding houses and lying-in hospitals, to the above committee, after they had been passed upon by the Attorney-General.

The question of establishing additional depots for mailing cases for sending specimens to the Board's laboratory for examination, was presented by the Secretary. He stated that the present arrangement of having such depots in cities and county seats only was very unsatisfactory to many physicians who were not in close touch with such places, thus causing great delay in getting mailing cases and in sending them to the laboratory.

On motion of Dr. Crossland, the Secretary was authorized to establish depots for mailing cases in all cities and villages of 2000 inhabitants and over.

The Secretary suggested that it would be of great value to the boards of health and health officers if a manual could be prepared, giving definite instructions, including proper blanks and forms, for the enforcement of the health laws and the rules and regulations of the boards of health. He recommended that an attorney be secured to aid in the preparation of such manual, providing the cost would not be too great and the Attorney-General decided that this could be legally done.

On motion of Dr. Chapman, the Secretary was instructed to refer this matter to the Attorney-General, and to report at the next meeting just what the cost would be of the preparation of such a manual.

The Board then adjourned to meet at 7 p. m.

SECOND SESSION

MAY 14TH, 1908.

The Board met pursuant to adjournment, at 7:00 p. m.

All members were present, including Dr. Warner.

The Secretary presented letters from two counties in regard to the act requiring the county commissioners to provide a hospital for tuberculosis in each county.

These communications suggested that, as the State Board of Health is required to approve the plans for such hospitals, it should give some indication of what these requirements would be.

On motion of Dr. Stanton, this matter was referred to the Secretary and he was authorized to prepare an outline of the requirements of such hospitals and to secure the services of an architect to make sketches of suitable buildings, for the information of the county authorities and others.

A petition and complaint was received from the trustees of Webster Township, Wood County, asking the State Board of Health to investigate the pollution of Poe Ditch and the Portage River by the sewage of Bowling Green, and to take action under the provisions of the Bense Act to abate a public nuisance caused by such pollution.

On motion of Dr. Stanton, this petition was referred to a committee, consisting of Dr. Chapman and the chief engineer, for investigation and report.

The Secretary presented a petition and complaint from the trustees of Hoaglin Township, Van Wert County, setting forth that Town Creek in said township was polluted by the sewage from Van Wert, thereby creating a public nuisance, detrimental to the health and comfort of persons in its vicinity.

On motion of Dr. Warner, it was voted to refer this complaint to a committee, consisting of Dr. Stanton and the chief engineer, for investigation and report.

The Secretary presented a letter from Mr. C. V. Hard of Wooster, in regard to the pollution of the public water supply of Wooster.

On motion of Dr. Stanton, the Secretary was instructed to reply to this communication, and state that the Board would be willing to investigate this complaint and take such action as might be deemed best whenever the petition to make such investigation, as required by the Bense Act, should be received.

There being no further business, the Board adjourned.

Attest: C. O. PROBST,
Secretary.

JUNE MEETING

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, at 8 p. m., June 17th, 1908.

All members were present.

The minutes of the last regular meeting, held April 22d, and of a special meeting, held May 14th, were read and approved.

The Secretary presented his report, which was approved and ordered filed for publication.

The report of the committee, consisting of Dr. Stanton and the chief engineer, Mr. Pratt, of their investigation of the pollution of Town Creek by the sewage of Van Wert was read. This investigation was made upon the request of the trustees of Hoaglin Township, Van Wert County.

On motion of Dr. Warner, seconded by Dr. Miller, the report of the committee was approved and adopted.

The Secretary reported that he had notified the mayor and council of Van Wert that complaint had been made by the trustees of Hoaglin Township, that Town Creek was being polluted by the sewage from the city of Van Wert; that an investigation had been made by a committee of the Board, and that there would be a meeting of the State Board of Health in Cleveland on the evening of June 17th, 1908, when they would have an opportunity to be heard in this matter.

A communication from the mayor and president of council of Van Wert was presented, stating that it would be impossible for them to be present in person, and presenting arguments to show why the city should not be required to install sewage purification works.

It was moved by Dr. Chapman, seconded by Dr. Crossland, that the Secretary be instructed to report the Board's findings in the case of Van Wert to the Governor and Attorney-General and request their approval of an order to be issued by the State Board of Health requiring the city of Van Wert to install and have in operation not later than October 1st, 1909, a satisfactory sewage disposal plant.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland, Miller and Hartzell.

In the negative, none.

Plans for a system of sewerage for the village of Lowellville, as shown on drawings submitted June 9th, 1908, by Mr. Eugene Kirk and Mr. H. M. Reel of Youngstown, consulting engineers, were presented by the Secretary, and also a report by the chief engineer of the Board upon said plans.

On motion of Dr. Miller, seconded by Dr. Warner, these plans were approved with the understanding that the village shall install a sewage purification plant of a design satisfactory to the State Board of Health whenever this is deemed necessary by said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman Palmer, Warner, Crossland, Miller and Hartzell.

In the negative, none.

The Secretary presented petitions from the trustees of Freedom Township, Wood County; from the trustees of Center Township, Wood County; from the trustees of Webster Township, Wood County, and from the board of health of the village of Pemberville, requesting the State Board of Health to investigate the pollution of Poe Ditch and the Portage River by sewage from the city of Bowling Green.

On motion of Dr. Warner, seconded by Dr. Stanton, these petitions were received and referred to a committee, consisting of Dr. Chapman and the chief engineer, for investigation and report.

A petition was presented from the trustees of Greenville Township, Darke County, asking the Board to investigate the pollution of Greenville Creek by the sewage from the city of Greenville.

On motion of Dr. Warner, seconded by Dr. Miller, it was voted to receive the petition and to refer it to a committee for investigation and report.

The Chair appointed as members of this committee, Dr. Stanton and the chief engineer.

The Secretary presented correspondence and a plan, submitted by The H. M. Alexander Company of Marietta, Pa., for supplying diphtheria antitoxin to physicians, through local boards of health, for the treatment of indigent persons.

On motion of Dr. Crossland, seconded by Dr. Warner, the Secretary was authorized to enter into a contract with The H. M. Alexander Company for supplying antitoxin in accordance with the plan presented.

A communication was presented from the Commercial Club of Springfield, inviting the State Board of Health to hold its next conference with local boards of health in that city.

The matter was referred to the President and Secretary, with power to act.

Plans were presented for a sanitary sewerage system for the Southwestern Sewer District, Zanesville, as shown on a general plan submitted January 24th, 1908, and on detail sheets submitted April 16th, 1908, by Mr. Henry I. Buell, designing engineer; also a report by the chief engineer of the Board upon said plans.

It was moved by Dr. Miller and seconded by Dr. Crossland that these plans be approved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland, Miller and Hartzell.

In the negative, none.

A communication was presented from the Assistant Attorney-General, W. H. Miller, giving an opinion to the effect that midwives were authorized to attend births which take place in maternity boarding houses and lying-in hospitals, as defined by the Adler Act.

The report of work done in the laboratory for the last quarter was read.

Several communications were presented from residents of St. Bernard, in reference to an alleged nuisance arising from noisome odors from certain fertilizing factories in that village. One of these communications was from Mr. Samuel B. Hammel, attorney for St. Bernard, which stated that the village had adopted an ordinance under which they hoped to suppress this nuisance, and that they would be glad to have the assistance of the State Board of Health in securing proper evidence to make up their case.

On motion of Dr. Warner, it was voted to appoint a committee to investigate this complaint.

The Chair appointed as members of this committee, Dr. Stanton, the Secretary and the chief engineer.

Matters previously acted upon by mail were then taken up for confirmation.

On motion of Dr. Stanton, seconded by Dr. Crossland, it was voted to confirm the Board's action of May 12th, 1908, approving the plans for a sewerage system for the village of Sylvania, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, on April 22d, 1908, provided that the sewage be purified in a manner satisfactory to the State Board of Health before the new sanitary sewers are used for purposes of any kind.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland, Miller and Hartzell.

In the negative, none.

On motion of Dr. Chapman, seconded by Dr. Crossland, it was voted to confirm the Board's action of May 26th, 1908, approving the plans for sewerage and sewage purification for the village of Wyoming, as shown on drawings submitted by The Riggs and Sherman Company on May 21st, 1908, provided:

1st. That the management of the plant be at all times satisfactory to the State Board of Health, and that the plant be enlarged when deemed necessary by said Board; and,

2nd. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being used, it being understood that the size of material indicated on plans may not be satisfactory.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Warner, Crossland, Miller and Hartzell.

In the negative, none.

There being no further business, the Board adjourned.

Attest: C. O. PROBST, Secretary.

JULY SPECIAL MEETING

A special meeting of the State Board of Health was held at the Hotel Victory, Put-in-Bay, July 8th, 1908, at 8:00 p. m.

All members were present.

Dr. Crossland, for the committee appointed to consider the proposed water supply for Zanesville, presented a letter from the board of public service of that city, requesting the State Board of Health to furnish a list of competent sanitary engineers from which some one might be selected to advise them as to what they should best do in the matter.

On motion of Dr. Chapman, the Secretary was authorized to furnish such a list of engineers.

The Secretary presented a communication from Martins Ferry in regard to a proposed new water supply for that city, together with a report of the engineer and the laboratory as to the quality of the new supply. He stated that the question was whether the Board should disapprove a public water supply which was satisfactory as regards the sanitary qualities of the water but unsatisfactory as regards physical properties, or an excess of iron or other objectionable mineral matter.

It was moved by Dr. Warner, and seconded by Dr. Miller, that this matter be referred to a committee for investigation and report to the Board.

The motion was carried.

The Chair appointed Dr. Crossland a committee of one to investigate and report upon this matter.

A communication was presented in regard to the construction of sewers for Put-in-Bay contrary to the terms of approval of the State Board of Health.

On motion of Dr. Stanton, it was voted that all the members of the Board present on the following day should arrange to meet the mayor and council of Put-in-Bay for a conference in regard to sewerage and water supply for the island.

There being no further business the Board adjourned.

Attest: C. O. Probst,
Secretary.

SEPTEMBER SPECIAL MEETING

A special meeting of the State Board of Health was held at the office of the Secretary at 8:00 p. m., September 22nd, 1908.

All members were present except Dr. Miller.

Dr. J. S. Shinn, health officer of Troy, Ohio, appeared before the Board, and asked whether the State Board of Health would recognize "internal vaccination" as a preventive of smallpox. He explained the situation there, where so-called "internal vaccination" had been administered to a considerable number of people.

Dr. Warner moved, and it was duly seconded, that the following resolution be adopted:

> "RESOLVED, That but one method of vaccination be recognized by the Ohio State Board of Health, and that is the one defined and adopted by the Conference of State and Provincial Boards of Health of North America, at a meeting held in New Haven, Connecticut, October 28 and 29, 1902, to-wit:
>
> "That vaccination may be defined as follows: An inoculation by scarification, puncture or injection beneath the epidermis, of a vaccine which produces, with some constitutional disturbance, the typical vaccine vesicle, which leaves, after the pock has healed, its characteristic scar.' "

The motion was carried.

The Secretary stated that the Board had voted at a previous meeting to make a special investigation of the disposal of garbage and other waste material, as outlined in the scheme proposed by Mr. Hansen, assistant engineer. The work was not started at that time, as it was doubtful whether sufficient funds would be available. As the special work on the Mahoning River had been unavoidably delayed in starting, the appropriations available would enable the garbage investigation to be taken up at once, and he recommended that this be done.

On motion of Dr. Warner, duly seconded, the Secretary was instructed to take up the question of garbage and waste disposal, as proposed, and be authorized to employ the necessary assistance and to purchase the necessary apparatus to do this as economically as possible.

The Secretary reported that the detailed investigation and report upon all existing water works in Ohio has been about half completed. That these investigations had been made at odd times by Mr. Hansen, and had covered a period of nearly two years. He recommended that additional engineering assistance be secured to enable this work to be completed in the shortest time possible, in order that a complete report upon all existing water works plants in Ohio could be published.

On motion of Dr. Warner, duly seconded, the Secretary was authorized to engage such help as would be necessary to do this.

The Secretary stated that the Board for the past three years had been in a small way investigating the disposal of creamery wastes. That many complaints were received of the pollution of small streams by such wastes. He recommended that a special study of the disposal of creamery wastes be made, with the view of recommending plans that would satisfactorily dispose of such waste substances.

On motion of Dr. Stanton, duly seconded, it was voted to take up the question of the disposal of creamery wastes under the direction of the Secretary, and that he be authorized to employ such help as may be necessary for this purpose.

The question of some experimental work in the disinfection of sewage effluents was spoken of by the Secretary. It was recalled that cooperative work along this line between the State Board of Health and the United States Agricultural Department had been carried on two years ago, but that conclusions had not been reached as to the best method for the disinfection of sewage effluents. He recommended that this work be taken up in connection with the engineering department.

On motion of Dr. Warner, duly seconded, the Secretary was authorized to spend not to exceed seven hundred (700) dollars in experimental work in the disinfection of sewage effluents.

The Secretary recalled that at the last regular meeting of the Board the question of issuing a manual of instructions to health officers had been considered, but that no definite action had been taken. He recommended that such a manual should be prepared for distribution to health officers.

On motion of Dr. Crossland, duly seconded, the Secretary was empowered to employ the necessary assistance in the preparation of such a manual.

A petition under the Bense Act was presented from the trustees of Symmes Township, Hamilton County, complaining of a nuisance caused by the pollution of the Little Miami River by the Victor Stamping Works.

The Chairman appointed Dr. Warner, Dr. Stanton and Mr. Hansen, assistant engineer, as a committee of three to investigate the complaint and report.

On motion, a recess was taken until 9:00 a. m. the following day.

SECOND SESSION.

September 23, 1908.

The Board met pursuant to adjournment. 9:00 a. m.

Those present were Drs. Palmer, Stanton, Warner, Crossland, Chapman and Mr. Hartzell.

The Secretary stated that petitions having been received under the Bense Act making complaint of the pollution of certain streams by the sewage from four municipalities, towit: Greenville, Van Wert, Bowling Green and Fostoria, these complaints had been investigated by committees of the Board, and that proper authorities of the cities named had been notified that they would be given an opportunity to be heard on this date in regard to these complaints, and that the representatives were present and ready to be heard. Thereupon the President asked that the representatives from Van Wert present their case.

The following representatives from Van Wert announced their presence, namely, C. E. Lawhead, mayor, H. C. Redrup, city auditor, and W. G. Edwards, councilman at large.

After a full hearing, with a stenographic report thereof, on motion of Dr. Chapman, duly seconded, the question as to the action to be taken against Van Wert was referred to executive session.

The President then called for representatives from Bowling Green. The following reported present: J. P. Chase, city solicitor, Charles Garnes, street commissioner, and E. N. Hubbard, councilman. These representatives were given a full opportunity to be heard in regard to conditions at Bowling Green, after which, upon motion of Dr. Stanton, duly seconded, the question of action to be taken in regard to complaint against Bowling Green was referred to executive session.

The President then called for representatives from Greenville. No representatives were present, but the Secretary presented a letter from the city clerk in reference to the complaint against the city.

The President then asked that representatives from Fostoria be heard. The following representatives were present: Walter M. Witherspoon, city solicitor, J. T. Peter, president board of public service, Frank Whitlock, secretary board of public service, and John Twining, a private citizen who is interested in the city's welfare. After a full hearing in regard to the complaint against the city, the question of the action to be taken by the Board in reference to this matter was referred to executive session.

The Board then went into executive session.

On motion of Mr. Hartzell, duly seconded, it was voted to refer the complaint against Fostoria to the committee which had investigated conditions there, with the view of having necessary changes in their disposal plant made without further action by the Board.

The complaint against Greenville was taken up, and on motion of Dr. Crossland this was referred back to the committee which investigated the conditions complained of for further consideration and report at the next meeting.

On motion of Dr. Crossland it was voted to postpone any action against Van Wert until the next meeting of the Board.

A recess was then taken until 2:00 p. m.

THIRD SESSION.

The Board reassembled at 2:00 p. m., the same members being present as before.

STREAM POLLUTION AT BOWLING GREEN

The Board, having under consideration the conditions in and about the city of Bowling Green as pertaining to the pollution of Poe Ditch by the discharge of sewage and other wastes into said ditch by the said city of Bowling Green, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Dr. Stanton. seconded by Mr. Hartzell, ordered read.

Said Board, upon consideration of said report, and upon other evidence in connection therewith, and after investigation of the conditions in and about the city of Bowling Green, finds that the sewage and other wastes flowing from the city of Bowling Green into said stream, known as Poe Ditch, have so corrupted the same as to give rise to foul and noxious odors, and to conditions detrimental to the comfort of those residing in the vicinity of said stream. And said city of Bowling Green, having been notified of the complaint heretofore filed with this Board, and of its findings made after investigation thereof, appeared before the Board, and was represented by the following officers, to-wit: P. G. Chase, city solicitor, Charles Garnes, street commissioner, and E. N. Hubbard, councilman, and an opportunity was then given to said city through and by its officers to be heard regarding said complaint, and discussion, both by the members of the Board and by the officers representing said city regarding said conditions, was then had.

Upon such hearing being given, said officers filed no evidence, protest or remonstrances against the action or findings heretofore made. After such hearing, it was moved by Dr. Stanton and seconded by Mr. Hartzell that the report and the recommendations therein contained be now approved and confirmed. Upon the call of the yeas and nays upon the adoption of such motion, the same resulted as follows: Yeas, Drs. Stanton, Warner, Crossland, Mr. Hartzell, and Drs. Chapman and Palmer. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Dr. Crossland that the improvements and changes recommended in said report be, and the same are hereby declared to be necessary, and that the same should be made on or before December 1st, 1909. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Mr. Hartzell, and Drs. Chapman and Palmer. Nays, none.

Thereupon, it was moved by Dr. Crossland and seconded by Dr. Stanton that the report and the findings of this Board be transmitted to the Governor and Attorney-General for their action thereon. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Mr. Hartzell, and Drs. Chapman and Palmer. Nays, none.

A report was presented upon a proposed water supply for the village of Plymouth from a quarry shown in application of the board of trustees of public affairs. It was moved by Dr. Stanton and seconded by Mr. Hartzell that the proposed supply be approved upon the following conditions:

1st. All surface drainage from the vicinity of buildings or roadways shall be effectually diverted from the quarry.

2nd. No cesspool or vault shall be permitted nearer than 500 feet to the water's edge.

3rd. All slops, garbage, night-soil, and any other wastes whatsoever from buildings within 500 feet of the water's edge shall be removed at least 3,000 feet from the quarry before being disposed of.

4th. No person shall be permitted to throw any refuse or substance into the water of the quarry.

5th. That the source of supply shall be abandoned, or purified, in a manner satisfactory to the State Board of Health at any time it should become dangerously contaminated in the opinion of said Board.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on a proposed water supply for the village of Swanton from wells, located as shown on plat of the village submitted by Mr. George Champe, consulting engineer. It was moved by Dr. Chapman and seconded by Mr. Hartzell that these wells be approved upon the following conditions:

1st. That samples of the water be submitted to the State Board of Health for analysis at regular intervals of not greater than six months.

2nd. That the council pass an ordinance prohibiting the use of any abandoned wells in the village for the purpose of disposing of domestic wastes, and providing for the abolition of cesspools and the reconstruction and maintenance of privies within 500 feet of the public supply wells, in accordance with suggested list of rules and regulations appended.

3rd. That if in the opinion of the State Board of Health the public water supply becomes so contaminated as to be dangerous to health, the village shall seek a new supply.

4th. That detailed plans showing the method of developing the supply be submitted to and receive the approval of the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on proposed plans for sewage purification for the village of Sylvania, as shown on drawings submitted by The Riggs and Sherman Company. It was moved by Dr. Stanton and seconded by Dr. Chapman that these plans be approved subject to the following conditions:

1st. That samples of the sand and gravel to be used as filtering material be submitted to the State Board of Health for approval before being put in place.

2nd. That the village authorities institute and maintain a system of accurate records, showing when, where, and in what manner every connection to the sewers is made.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on proposed plans for sewerage and sewage purification for a public school building at Waterville as shown on drawings submitted by The Riggs and Sherman Company. It was moved by Dr. Chapman and seconded by Dr. Stanton that these plans be approved.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on proposed plans for sewerage and sewage purification for the village of Jefferson. It was moved by Mr. Hartzell and seconded by Dr. Chapman that these be referred back to the village authorities for revision.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

There being no further business, the Board adjourned.

Respectfully submitted,

C. O. Probst,

Secretary.

OCTOBER MEETING

A regular meeting of the State Board of Health was held at the Beckel House, Dayton, Ohio, at 8:00 p. m., October 19th, 1908.

Those present were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

The minutes of the meeting held in June, 1908, were read and approved. The minutes of two special meetings of the Board, one held in July, 1908, and the other in September, 1908, were read and approved.

Dr. Byron Stanton, President-elect, then assumed the chair.

Dr. L. C. Weimer, councilman of the sixth ward of Dayton, addressed the Board in regard to the alleged pollution of the Miami River by the wastes from the Aetna Paper Company.

Mr. C. O. Lasley, city engineer, Fremont, Ohio, presented plans for a sewer on the East Side of Fremont to discharge into the Sandusky River at the foot of Chestnut Street.

On motion of Dr. Warner it was voted to refer the plans to a committee consisting of Dr. Chapman and the chief engineer for investigation and report.

The committee, consisting of Dr. Warner, Dr. Stanton and the chief engineer, appointed to investigate the complaint in regard to the pollution of the Little Miami River by the Victor Stamping Works of Twightwee, Ohio, submitted their report.

On motion of Dr. Chapman seconded by Dr .Crossland, the report of the committee was adopted.

A petition was presented from the trustees of Orwell Township, Ashtabula County, requesting the Board to investigate a nuisance caused by the wastes from a creamery operated by the Ohio and Pittsburg Milk Company near East Orwell, Ohio.

On motion of Dr. Warner it was voted to refer this petition to a committee for investigation and report. The President appointed Dr. Palmer and the chief engineer as this committee.

A petition was read by the Secretary from the clerk of the council of the city of Dayton, Ohio, in regard to the pollution of the Miami River by the discharge of liquid wastes from the Aetna Paper Company.

On motion of Dr. Chapman it was voted to refer this petition to the Board as a committee of the whole for an investigation at 11:00 o'clock a. m. of the following day.

The Secretary then presented his quarterly report which was received and ordered filed for publication.

A communication was presented from The Riggs and Sherman Company, consulting engineers, in reference to a proposed water supply for the city of Zanesville.

On motion of Dr. Palmer, this communication was referred to the special committee previously appointed to consider a proposed new water supply for Zanesville.

The committee, consisting of Dr. Stanton and the chief engineer, appointed to investigate the complaint against Greenville as regards pollution of Greenville Creek by sewage, reported that they made a second visit to Greenville to investigate the conditions complained of, and found no reason to change the recommendations made in their report previously submitted.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Palmer and seconded by Dr. Chapman to confirm the Board's action of July 24th, 1908, approving amended plans for a water purification plant for Ashtabula (approved January 22nd, 1908) as shown on drawings made by the Norwood Engineering Company, and submitted July 16th, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Mr. Hartzell to confirm the Board's action of July 17th, 1908, approving rules and regulations, prohibiting spitting upon sidewalks and other public places, adopted by E. A. Kauffman, health officer of Ashland, on June 15th, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the Board's action, July 17th, 1908, approving an order of the health officer of Bridgeport in regard to the disposal of night-soil, wastes from water closets and privies, and wash water and slops.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Crossland to confirm the Board's action, August 13th, 1908, approving plans for proposed sewage purification for the Pickaway County Infirmary, Circleville, as shown on drawings and described in specifications submitted by Mr. N. C. Bohnert, county auditor, on July 24th, 1908, provided that the layer of sand in the filters be increased by one foot and the layer of gravel decreased by a corresponding amount; and that samples of both kinds of filtering material be submitted to and receive the approval of the State Board of Health before being placed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Palmer to confirm the Board's action, July 24th, 1908, approving revised plans for proposed water supply for Dresden, to be derived from driven wells located in the bottom land bordering the Muskingum River, as shown on drawings submitted by Mr. Horace D. Munson, consulting engineer, on July 25th, 1908, provided:

1st. That the wells be relocated in a position farther removed from the village if at any time this should be deemed necessary by the State Board of Health; and,

2nd. That the reservoir be covered in a manner satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Chapman to confirm the Board's action, July 23rd, 1908, approving rules and regulations adopted by Dr. W. A. Westervelt, health officer in lieu of a board of health, Dublin, on July 16th, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Mr. Hartzell to confirm the Board's action, July 20th, 1908, approving plans for proposed sewerage and sewage purification for the city of Galion, as shown on drawings submitted July 9th, 1908, by Messrs. Bradbury and Shute, consulting engineers, provided:

1st. That the purification works be constructed before any of the new sewers are placed in use;

2nd. That detailed drawings of the controlling chamber and devices be submitted to the State Board of Health for approval as soon as such apparatus has been chosen; and,

3rd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the Board's action, August 2nd, 1908, approving the appointment of Dr. H. M. Platter as inspector of maternity boarding houses and lying-in hospitals.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Crossland to confirm the Board's action, September 5th, 1908, approving rules and regulations for the government of maternity boarding houses and lying-in hospitals.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Palmer to confirm the Board's action, September 11th, 1908, disapproving proposed sewers for East Piqua, as shown on a drawing submitted by Mr. H. E. Whitlock, city engineer of Piqua, on August 24th, 1908, unless council first passed an ordinance forbidding the tapping of the proposed sewers, or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind; a certified copy of such ordinance to be filed with the State Board of Health before the contract for the proposed work is let.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Chapman to confirm the Board's action, July 24th, 1908, approving a proposed water supply for Martins Ferry, to be derived from driven wells along the edge of the Ohio River, as shown on blue print submitted by Mr. E. D. Lash, secretary of the board of public service, on June 15th, 1908.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative none

It was moved by Dr. Chapman and seconded by Dr. Warner to confirm the Board's action, June 26th, 1908, approving a sample of sand to be used in the sewage purification plant at Chagrin Falls, submitted June 19th, 1908, by the Walter P. Rice Engineering Company of Cleveland, consulting engineers, provided all stones which will not pass a screen having a ¼-inch mesh be removed. The sample was submitted in accordance with Condition No. 2 of the Board's approval of the plans dated September 5th, 1907.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Palmer and Hartzell.

In the negative, none.

A recess was then taken until 9:00 a. m. the following day.

The Board reassembled at 9:00 a. m., October 20th.

Those present were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

SECOND SESSION.

9 A. M., OCTOBER 20TH, 1908.

A report on a proposed additional water supply for Athens was presented by the Secretary.

It was noted that the present water supply of Athens was never submitted to the State Board of Health for approval, as required by law.

After full consideration of the subject it was moved by Dr. Palmer, seconded by Mr. Hartzell, to approve the present supply of Athens, and an additional supply to be obtained from wells Nos. 4, 6 and 7, as shown on sketch of plans on file with the State Board of Health, provided:

1st. That all privies within 500 feet of any of the public supply wells be constructed and maintained in such manner as to prevent any contamination of the surrounding soil, and that their method of construction and maintenance be approved by the State Board of Health.

2nd. That any sewer laid within 500 feet of the public supply wells be constructed in a special manner to be approved by the State Board of Health, with a view to preventing the contamination of the surrounding soil.

3rd. That no new well be placed in use without the approval of the State Board of Health.

4th. That any or all the wells be abandoned whenever in the opinion of the State Board of Health the water shall have become dangerously contaminated; also to disapprove of the proposed additional supply from well No. 5 on account of its objectionable location.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer, and Mr. Hartzell.

In the negative, none.

A report on a proposed additional water supply for Wilmington to be obtained from wells lying between the C. & M. V. Railroad and Main Street, was presented by the Secretary.

It was moved by Dr. Chapman and seconded by Mr. Hartzell that inasmuch as the village of Wilmington is in need of an increased water supply that the Board approve the proposed additional supply for a period of one year, during which time the water company will be expected to take steps to secure, if possible, an additional supply from a location more remote from the village, and farther removed from possible sources of contamination, with the advice that as a measure to prevent the contamination of the public supply after it is drawn from the wells, the standpipe should be provided with a substantial roof, the manholes over cisterns surrounding wells and over sand catchers should be provided with watertight covers, and the hand pumps provided for cattle watering should be removed.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer, and Mr. Hartzell.

In the negative, none.

A report on a proposed water supply for the village of Coalton, to be obtained from an abandoned mine located on the property of Mrs. Hipple, about one-fourth mile south of Coalton on the eastern slope of one of the hills bordering Pigeon Creek, was presented by the Secretary.

It was moved by Dr. Chapman and seconded by Dr. Palmer to approve the proposed water supply for Coalton, provided:

1st. That the mine entry be carefully closed to prevent the entrance of persons or animals.

2nd. That the collecting well be protected from surface contamination.

3rd. That the village obtain a guarantee that the Scott mine will not be worked within 75 feet of any of the galleries or chambers of the abandoned mine proposed for public water supply purposes.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed water supply for the village of Malta, to be obtained from wells located on what is known as the glass works lot, as shown on map submitted by Mr. Paul R. Murray, of New Philadelphia, consulting engineer.

It was moved by Dr. Palmer and seconded by Dr. Chapman that the proposed water supply for Malta be approved, provided:

1st. That an ordinace be passed by the village council prohibiting the location of any additional buildings within 500 feet of any well.

2nd. That all surface drainage now reaching the property be diverted in a manner satisfactory to the State Board of Health.

3rd. That the drainage from existing buildings within 500 feet of the glass works lot be regulated in a manner satisfactory to the State Board of Health.

4th. That complete plans showing method of developing the public supply, including plans of the pumping station and accessories, be submitted to and receive the approval of the State Board of Health before the water is supplied to consumers.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed water supply for the village of Newton Falls, to be obtained from wells located on land owned by the village on the east branch of the Mahoning River near the L. E. A. & W. Railroad station.

It was moved by Dr. Palmer and seconded by Dr. Chapman that the proposed water supply for Newton Falls be approved, provided:

1st. That all sources of pollution within 500 feet of the wells be removed, and that the village obtain control of the territory within 500 feet of any well with reference to preventing the establishment of any new source of pollution.

2nd. That the iron be removed from the water in a satisfactory manner before delivering it to consumers.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed additional water supply for Massillon, to be obtained from three deep wells located in the valley of Newman Creek northwest of the city, as shown on sketch on file with the State Board of Health.

It was moved by Mr. Hartzell and seconded by Dr. Palmer that the proposed water supply for Massillon be approved, provided that samples of water from the proposed wells be submitted to the State Board of Health for analyses at regular intervals of six months.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed water supply for the city of Portsmouth to be derived from the gravel deposits in the Ohio River, located in the Tygart bar about three-fourths of a mile above the city.

It was moved by Dr. Chapman and seconded by Dr. Palmer to approve the proposed water supply for Portsmouth, provided:

1st. That a filtration plant of a design satisfactory to the State Board of Health be immediately installed whenever the water obtained from the Tygart bar shall be deemed unsafe by said Board.

2nd. That detailed plans showing method of obtaining the water, together with all features of the new water works, be submitted to and receive the approval of the State Board of Health before work is commenced.

3rd. That the new works be designed and constructed under the supervision of a competent engineer experienced in matters relating to water purification.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on proposed additional sewerage for Piqua.

It was moved by Dr. Palmer and seconded by Dr. Chapman to approve the plans for the proposed sewer for Second Street, East Piqua, as shown on a drawing submitted by Mr. H. E. Whitlock, city engineer for Piqua, in view of the fact that an ordinance has been passed dated

July 2nd, 1907, by the council of the city of Piqua, prohibiting the tapping of any storm sewer in the city for sanitary drainage.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed sewerage system and sewage purification for the court house and jail at Jefferson.

It was moved by Dr. Palmer and seconded by Mr. Hartzell to approve the proposed sewerage system and sewage purification for the court house and jail at Jefferson, as shown on drawings submitted by Mr. J. S. Matson, county engineer, on September 12th, 1908, and October 3rd, 1908, provided that a suitable person be employed to care for the disposal plant under instructions of the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

The Secretary renewed his recommendation that the Board issue a quarterly bulletin in lieu of the monthly sanitary bulletin.

On motion of Dr. Chapman, seconded by Mr. Hartzell, it was voted to publish a quarterly bulletin in lieu of the monthly sanitary bulletin, and, if possible, that ten thousand copies be printed for each issue

On motion it was voted to adjourn to the call of the President.

Attest: C. O. Probst,
Secretary.

DECEMBER SPECIAL MEETING

A special meeting of the State Board of Health was held at the office of the Board on December 9th, 1908.

Those present were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

STREAM POLLUTION AT DELPHOS

The Board took up for consideration the report of the committee appointed to investigate the complaint against the village of Delphos, to-wit: That the sewage and other wastes of said village had so corrupted Jennings Creek and Auglaize River as to create conditions detrimental to the health and comfort of the citizens in its vicinity. Mr. G. L. McKibben, of Van Wert, Ohio, consulting engineer for the village of Delphos, spoke in regard to the complaint. He stated that much of their trouble had come from permitting the sedimentation tank which receives the sewage of Delphos to become filled, and further that a part of it, he believed, came from the acid wastes of the Delphos Manufacturing Company. He expressed his opinion that if the sedimentation tank is kept clean, and said company be required to locally purify its wastes, that the cause for complaint would be largely or wholly removed. (See page 224.)

It was moved by Dr. Chapman and seconded by Dr. Palmer that further action in this case be postponed; provided that the sedimentation tank receiving the sewage of Delphos be operated in a proper manner, and that the village authorities require the Delphos Manufacturing Company to properly purify its wastes before turning them into the stream.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

STREAM POLLUTION AT ALLIANCE

The Board, having under consideration the conditions existing in and about the city of Alliance as pertaining to the pollution of the Mahoning River by the discharge of sewage and other wastes into said river by the said city of Alliance, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Dr. Palmer and seconded by Dr. Warner ordered read. (See page 233.)

Said Board then upon consideration of the report of said committee, and upon other evidence in connection therewith, finds that the sewage and other wastes flowing from the city of Alliance into said stream, known as Mahoning River, have so corrupted the same as to give rise to foul and noxious odors, and to conditions detrimental to the comfort of those residing in the vicinity of said stream, and said city of Alliance having been notified of the complaint heretofore filed with this Board and of its findings made after investigation thereof, appeared before the Board and was represented by Mr. John J. Brown, city solicitor. An opportunity was then given to said city through and by its officer, Mr. Brown, to be heard regarding said complaint, who said that the conditions were as set forth in the report of the committee of this Board, and that no good cause could be urged why the city of Alliance should not be required to properly purify its sewage, as recommended by said committee.

After such hearing, it was moved by Dr. Warner and seconded by Dr. Palmer that the report of the committee of the Board be now approved and confirmed. Upon the call for yeas and nays upon the adoption of such motion, the same resulted as follows: Yeas, Drs. Stanton, Crossland, Miller, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Dr. Palmer that it is hereby declared to be necessary that the city of Alliance shall be required to purify its sewage in a manner satisfactory to the State Board of Health on or before December 1st, 1909. Upon call for yeas and nays upon the adoption of such motion the same resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Dr. Palmer that the report and the findings of this Board be transmitted to the Governor and Attorney-General for their action thereon. Upon the call for yeas and nays upon the adoption of such motion, the same resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION AT CAMBRIDGE

The Board, having under consideration the conditions in and about the city of Cambridge as pertaining to the pollution of Wills Creek by the discharge of sewage and other wastes into said creek by the said city of Cambridge, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Dr. Warner and seconded by Dr. Crossland ordered read. (See page 227.)

It was then moved by Dr. Warner and seconded by Dr. Crossland that the Board does find from the report of its committee, and other evidence, that Wills Creek at and below Cambridge is grossly polluted by the sewage and other wastes from the said city of Cambridge, and that the conditions thereby created are detrimental to the comfort of persons residing in its vicinity. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Dr. Crossland that the Secretary of this Board notify the city of Cambridge of the findings made by this Board, and that the Board has fixed Wednesday, the 20th day of January, 1909, at 2:00 p. m. at the office of the State Board of Health, Columbus, Ohio, as the time and place when and where the city of Cambridge by its officers, or others, may have an opportunity to be heard, and to show cause, if any, why said city should not be required to purify, or make such other disposal of its sewage and other wastes as will remove the conditions complained of. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION BY DARKE COUNTY INFIRMARY

The Board, having under consideration the conditions complained of as created by the discharge of sewage and other wastes into Bridge Creek by the county infirmary of Darke County, Ohio, and having the report of the committee heretofore appointed by this Board to investigate such condition, it was by motion of Dr. Chapman and seconded by Mr. Hartzell ordered read. (See page 229.)

It was then moved by Dr. Chapman and seconded by Mr. Hartzell that the Board does find from the report of its committee, and other evidence, that Bridge Creek is grossly polluted by the sewage from Darke County Infirmary, and that the conditions thereby created are detrimental to the comfort of persons residing in its vicinity. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Chapman and seconded by Mr. Hartzell that the Secretary of this Board notify the County Commissioners of Darke County, Ohio, of the findings made by this Board, and that the Board has fixed Wednesday, the 20th day of January, 1909, at 2:00 p. m. at the office of the State Board of Health, Columbus, Ohio, as the time and place when and where the said County Commissioners by their officers or others may have an opportunity to be heard, and to show cause, if any, why said County Commissioners should not be required to purify, or make such other disposal of, the sewage from said infirmary as will remove the conditions complained of. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION BY ELMORE

The Board, having under consideration the conditions in and about the village of Elmore as pertaining to the pollution of the Portage River by the discharge of sewage and other wastes into said river by the said village of Elmore, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Dr. Warner and seconded by Dr. Chapman ordered read. (See page 222.)

It was then moved by Dr. Warner and seconded by Dr. Chapman that the Board does find from the report of its committee, and other evidence, that the Portage River is grossly polluted at Elmore by the sewage and other wastes from said village of Elmore, and that conditions thereby created are detrimental to the comfort of persons residing in the vicinity of said stream at Elmore. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Dr. Chapman that the Secretary of this Board notify the village of Elmore of the findings made by this Board, and that the Board has fixed Wednesday, the 20th of January, 1909, at 2:00 p. m. at the office of the State Board of Health, as the time and place when and where the village of Elmore by its officers or others may have an opportunity to be heard, and to show cause, if any, why said village should not be required to purify, or make such other disposal of, its sewage as will remove the conditions complained of. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION AT RITTMAN

The Board, having under consideration the conditions in and about the village of Rittman as pertaining to the pollution of Chippewa Creek by the discharge of manufacturing wastes into said creek by The Ohio Boxboard Company, of Rittman, and having before it the report of the committee heretofore appointed by this Board to investigate such condition, the same was by motion of Dr. Chapman and seconded by Dr. Palmer ordered read. (See page 230.)

It was then moved by Dr. Chapman and seconded by Dr. Palmer that the Board does find from the report of its committee, and other evidence, that Chippewa Creek is grossly polluted by the manufacturing wastes of The Ohio Boxboard Company, and that the conditions thereby created are detrimental to the comfort of persons residing in the vicinity of Chippewa Creek. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Chapman and seconded by Dr. Palmer that the Secretary of this Board notify The Ohio Boxboard Company, of Rittman, of the findings made by this Board, and that the Board has fixed Wednesday, the 20th day of January, 1909, at 2:00 p. m., at the office of the State Board of Health, Columbus, Ohio, as the time and place when and where The Ohio Boxboard Company by its officers or others may have an opportunity to be heard, and to show cause, if any, why said Company should not be required to purify, or make such other disposal, of its manufacturing wastes as will remove the conditions complained of. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

STREAM POLLUTION BY MARYSVILLE

The Board, having under consideration the conditions in and about the village of Marysville as pertaining to the pollution of Mill Creek and the Scioto River by the discharge of sewage and other wastes into said streams by said village of Marysville, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Dr. Chapman and seconded by Mr. Hartzell ordered read. (See page 237.)

It was then moved by Dr. Chapman and seconded by Mr. Hartzell that the Board does find from the report of its committee, and other evidence, that Mill Creek is grossly polluted by the sewage and other wastes from said village of Marysville, and that the conditions thereby created are a menace to the public water supply of the city of Columbus, Ohio. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Chapman and seconded by Mr. Hartzell that the Secretary of this Board notify the village of Marysville of the findings of this Board, and that the Board has fixed Wednesday, the 20th day of January, 1909, at 2:00 p. m. at the office of the State Board of Health, Columbus, Ohio, as the time and place when and where the village of Marysville by its officers or others may have an opportunity to be heard, and to show cause, if any, why said village should not be required to purify, or make such other disposal of, its sewage as will remove the conditions complained of. The roll call for the yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION AT MIAMISBURG

The Board, having under consideration the condition in and about the National Military Home as pertaining to the pollution of the Great

Miami River, the Secretary of this Board was by motion of Dr. Chapman, seconded by Dr. Warner, instructed to send a copy of the report to the authorities of Miamisburg, the conclusion of the committee, appointed by this Board to make investigation of the complaint of the village council of Miamisburg against the Soldier's Home, exclusive of other sources of contamination of the river, under the Bense Act, being that the complaint is not justified in view of the information obtained by them. (See page 240.)

STREAM POLLUTION BY GREENVILLE

The Board, having under consideration the conditions in and about the city of Greenville as pertaining to the pollution of Greenville Creek by the discharge of sewage and other wastes into said creek by the said city of Greenville, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was by motion of Mr. Hartzell and seconded by Dr. Chapman ordered read. (See page 207.)

Dr. Stanton and the chief engineer, to whom was referred the complaint in regard to the pollution of Greenville Creek by sewage from the city of Greenville, reported that they had recently made a second examination of the conditions existing at Greenville as set forth in said complaint, and saw no good reasons to change their recommendations made in a previous report in regard to this matter.

Said Board, upon consideration of said report, and upon other evidence in connection therewith, and after investigation of the conditions in and about the city of Greenville, finds that the sewage and other wastes flowing from the city of Greenville into said stream, known as Greenville Creek, have so corrupted the same as to give rise to foul and noxious odors, and to conditions detrimental to the comfort of those residing in the vicinity of said stream, and said city of Greenville having been notified of the complaint heretofore filed with the Board, and of its findings, made after investigation thereof, and after due notification to appear before said Board, and show cause, if any, why an order should not be issued requiring said city of Greenville to purify its sewage, failed to appear.

It was thereupon moved by Dr. Warner and seconded by Mr. Hartzell that the improvements and changes recommended in said report be and the same are hereby declared to be necessary, and the same should be made on or before October 1st, 1909. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Chapman, Palmer and Hartzell. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Dr. Chapman that the report and findings of this Board be submitted to the Governor and Attorney-General for their action thereon. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Chapman, Palmer and Mr. Hartzell. Nays, none.

STREAM POLLUTION BY VAN WERT

The Board, having under consideration the conditions in and about the city of Van Wert as pertaining to the pollution of Town Creek by the discharge of sewage and other wastes into said creek by the said city of Van Wert, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was, by motion of Dr. Palmer and seconded by Dr. Stanton ordered read. (See page 204.)

It was moved by Dr. Stanton and seconded by Mr. Hartzell that the Board rescind its action in reference to the complaint against the city of Van Wert, taken at a meeting of said Board, held June 17th, 1908. Upon the call for yeas and nays upon the adoption of such motion, the same resulted as follows: Yeas, Drs. Stanton, Warner, Crossland, Chapman, Palmer and Mr. Hartzell. Nays, none.

Said Board, upon consideration of the report of said committee, and upon other evidence in connection therewith, finds that the sewage and other wastes flowing from the city of Van Wert into said stream, known as Town Creek, have so corrupted the same as to give rise to foul and noxious odors, and to conditions detrimental to the comfort of those residing in the vicinity of said stream, and said city of Van Wert having been notified of the complaint heretofore filed with this Board and of its findings made after investigation thereof, appeared before the Board and was represented by the following officers, to-wit: C. E. Lawhead, mayor; H. C. Redrup, city auditor, and W. G. Edwards, councilman-at-large. An opportunity was then given to said city through and by its officers to be heard regarding said complaint, and discussion by the members of the Board and by the officers representing said city regarding said conditions was then had.

Upon such hearing being given, said officers filed no evidence, protest or remonstrance against the action or findings heretofore made. After such hearing, it was moved by Dr. Stanton and seconded by Mr. Hartzell that the report and the recommendations therein contained be now approved and confirmed. Upon the adoption of such motion the yeas and nays were: Yeas, Drs. Stanton, Warner, Crossland, Chapman, Palmer and Mr. Hartzell. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Dr. Crossland that the improvements and changes recommended in said report be and the same are hereby declared to be necessary, and the same should be made on or before December 1st, 1909. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Chapman, Palmer and Mr. Hartzell. Nays, none.

Thereupon it was moved by Dr. Crossland and seconded by Dr. Stanton that the report and findings of this Board be submitted to the Governor and Attorney-General for their action thereon. Upon the adoption of said motion, the yeas were Drs. Stanton, Warner, Crossland, Chapman, Palmer and Mr. Hartzell. Nays, none.

Dr. H. M. Platter, Inspector of Maternity Boarding Houses and Lying-in Hospitals, presented a report of his investigations of such institutions in Cincinnati, Hamilton County, Ohio.

Applications for licenses to conduct maternity boarding houses and lying-in hospitals in Cincinnati were presented from Sister Agnes Regina, Superintendent of the St. Joseph's Maternity Hospital and Infants' Asylum; Jacob Pister, President of The Ohio Maternity Hospital; the Home for the Friendless and Foundlings; and Ida Prickett. These applications were recommended for approval by the local board of health.

It was moved by Dr. Palmer and seconded by Dr. Chapman that licenses be granted to the above applicants. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

Applications for licenses to conduct maternity boarding houses and lying-in hospitals in Cincinnati were presented from Dr. J. B. Flack, Annie Powell, Mary Howard and Dr. Annie Florein.

It was moved by Dr. Chapman and seconded by Mr. Hartzell that the application of Dr. J. B. Flack be held for further investigation, and that the applications of Annie Powell, Mary Howard and Dr. Annie Florein be rejected upon the grounds that they had not been approved by the board of health of Cincinnati, as required by the act governing such institutions. The roll call for yeas and nays resulted as follows: Yeas, Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell. Nays, none.

No action was taken on the application of Nellie Hefferman, the applicant having died since the application was filed.

The Secretary stated that it would be necessary to make application to the postoffice authorities for the admission of the proposed quarterly to the mails at second-class postage rates, and to find a name for the quarterly journal. He recommended that the journal be called "Quarterly Bulletin Ohio State Board of Health." On motion of Dr. Palmer, this name was adopted.

The bill proposed for the creation of deputy state health officers, which had been previously sent to the members, was taken up for discussion.

On motion of Dr. Warner it was voted to refer the bill, with proposed amendments, to a committee for consideration and report. The Chair appointed Dr. Warner and the Secretary as members of this committee.

A recess was then taken to 8:30 a. m. of the following day.

SECOND SESSION.

The Board reassembled at 8:30 a. m., December 10th, pursuant to adjournment.

Those present were Drs. Stanton, Crossland, Chapman, Warner, Palmer and Mr. Hartzell.

A report on the water supply for the village of Beach City was presented by the Secretary.

The report showed that, through error or neglect, the plans for the water supply of Beach City had never been submitted to the State Board of Health for approval, as required by law. The report of the Board's engineer showed that the wells are satisfactorily located, and that the quality of the water is good.

It was moved by Dr. Crossland and seconded by Dr. Palmer to approve the water supply for Beach City, as shown on drawings prepared by Mr. L. E. Chapin, consulting engineer, provided:

1st. That no house or possible source of pollution be permitted within 400 feet of any of the wells.

2nd. That no new wells be installed without first obtaining the approval of the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on a proposed water supply for Shawnee to be obtained from wells located southwest of the village and south of the tracks of the Z. & W. Railroad in the valley of Shawnee Run, as shown in plans and specifications submitted by Messrs. Bradbury and Shute, consulting engineers, on November 17th, 1908.

It was moved by Mr. Hartzell and seconded by Dr. Palmer to approve the said plans for Shawnee; provided, the village take steps to prevent the location of habitations or other buildings within at least 300 feet of any well.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented on an additional water supply for the village of Hiram to be obtained from a ravine located about 50 feet from the present pumping station.

It was moved by Dr. Chapman and seconded by Dr. Palmer to approve the proposed water supply for Hiram; provided, that precautions be taken to eliminate all surface water from the supply, and that the additional supply be used as an emergency supply only.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on location of proposed water supply intake for the village of Huron, the plans therefor providing for taking water from the Huron River, from Lake Erie west of the westerly breakwater, and from Lake Erie east of the easterly breakwater.

It was moved by Dr. Palmer and seconded by Dr. Warner to approve plans for the location of the intake from Lake Erie some 1,900 feet west of the westerly breakwater and west of the mouth of the First Cove, with the understanding that the action of the Board at this time is simply in regard to the location of the intake, that the water is to be filtered, and that full detailed plans for the filtration plant and water works shall be submitted to the Board, for approval as soon as the same are prepared.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed additional water supply for the city of Mansfield to be obtained from what is known as Hedges or Paper Mill spring located in the southeastern portion of the city near the edge of the bottom land in the valley of Wolf Creek.

It was moved by Dr. Palmer and seconded by Dr. Chapman to approve said proposed water supply for said city of Mansfield, provided:

1st. That this additional source of public supply be immediately abandoned whenever investigation by the State Board of Health indicates the necessity of so doing.

2nd. That complete plans showing the development of this additional supply be submitted to and receive the approval of the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on proposed additional sewerage for the city of Fremont, being plans for a sewer on the East Side to discharge into the Sandusky River at the foot of Chestnut Street, as submitted by Mr. C. O. Lasley, city engineer, on October 20th, 1908.

It was moved by Dr. Crossland and seconded by Dr. Chapman to approve the said plans for a sewer on the East Side of Fremont, as submitted by Mr. C. O. Lasley, city engineer, on October 20th, 1908; provided, that the outlet, together with the outlet of the existing sewer at that point, be caused to discharge into deep water.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

The Board further considered a plan for a relief sewer to intercept the storm flow in the Front Street sewer, Fremont, and to discharge at a point just above Garrison Street, as shown on plans mentioned above, which was approved on motion of Mr. Hartzell and seconded by Dr. Warner.

A report was presented by the Secretary on proposed sewerage and sewage purification for the village of College Hill, as shown on plans submitted by Mr. J. A. Stewart, consulting engineer.

It was moved by Dr. Warner and seconded by Dr. Crossland to approve said plans for proposed sewerage and sewage purification for the village of College Hill, as shown on plans submitted by Mr. J. A. Stewart, consulting engineer, provided:

1st. That the village employs a competent man to operate the plant in a manner satisfactory to the State Board of Health.

2nd. That before the construction of the plant is completed the consulting engineer submits to the State Board of Health final designs for the equalizing chambers and sprinkler system together with all experimental data on which the designs are based.

3rd. That the local authorities maintain permanent records of the exact locations and methods of construction of all connections that are made to the village sewers.

4th. That the plant be properly covered.

A report was presented by the Secretary on a proposed sewer in Cheapside Street in the village of Elmore.

It was moved by Dr. Palmer and seconded by Dr. Chapman to disapprove the proposed sewer in Cheapside Street in Elmore, unless, first, there be provided a suitable water supply for flushing said sewer; and second, that there be constructed an intercepting sewer to convey the dry weather flow from this and all other outlets to a point below the cemetery where the sewage shall be purified in a manner satisfactory to the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed storm water sewer for Ney with an outlet into the southerly branch of Lick Creek at the south side of the west abutment of the Main Street bridge.

It was moved by Dr. Chapman and seconded by Mr. Hartzell to approve said plans for the proposed storm sewer of Ney; provided, that an ordinance be passed by council forbidding the tapping of the proposed sewer or any sewers which may in the future be tributary thereto for the purpose of admitting water closet wastes, cesspool overflow, sink drainage, or household wastes of any kind; and that a certified copy of said ordinance be filed with the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

A report was presented by the Secretary on a proposed storm water sewer for the city of Lancaster.

It was moved by Dr. Palmer and seconded by Dr. Crossland to approve the plans for a storm water sewer in the southern part of the city of Lancaster, as shown on plans submitted by Mr. John N. Wolfe, city engineer, on September 11th, 1908; provided, that an ordinance be passed by council forbidding the tapping of the proposed sewer or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage or household wastes of any kind; and that a certified copy of said ordinance be filed with the State Board of Health.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

The Secretary presented plans for sewerage and sewage disposal for the State Sanatorium for Tuberculosis, at Mt. Vernon, prepared by Mr. Frank L. Packard, architect.

It was moved by Dr. Warner and seconded by Dr. Palmer to approve said plans for the State Sanatorium at Mt. Vernon.

Those voting in the affirmative were Drs. Stanton, Crossland, Warner, Chapman, Palmer and Mr. Hartzell.

In the negative, none.

On motion it was voted to adjourn to the call of the President.

Attest: C. O. Probst,
Secretary.

PUBLIC WATER SUPPLIES

REPORT ON PROPOSED WATER PURIFICATION FOR ASHTABULA.

On December 18th, 1907, there were received from Messrs. Chapin and Knowles of Canton, consulting engineers for The Ashtabula Water Company, plans for proposed water purification plant for that city. In anticipation of these plans being submitted, the chief engineer visited Ashtabula on December 17th, 1907, and made the necessary inspection. January 21th, 1908, revised plans were submitted, which were examined by the engineering department, and the following report was made:

Ashtabula, having a population at the present time of about 15,000, is located on the shore of Lake Erie near the mouth of the Ashtabula River. Water has been supplied to the city by a private corporation for twenty years, the supply being derived from Lake Erie through an intake located a short distance west of the mouth of the Ashtabula River. Investigations by the State Board of Health have in the past shown the unpurified lake water to have caused typhoid fever.

The franchise of the water company was last year renewed, and the company passed to different management. Under the renewed franchise the company is obliged to erect a filter plant and furnish purified water; hence, the reason for the submission of the proposed plans.

The present daily water consumption is less than 4,000,000 gallons per day, but the filter plant has been designed for 6,000,000 gallons per day. The proposed filter plant is to be of the mechanical type, of modern construction, and covered by a substantial brick building. The plant is to be located on a strip of land 66 feet wide and some 300 feet long, owned by the water company and extending from the present pumping station to the shore of the lake. The land on either side of this strip is held for railroad purposes, and, it is claimed, cannot be purchased.

The raw water is to be taken from the existing circular pump well which is connected to the 24-inch intake line extending some 1,500 feet into the lake. The filtered water is to be stored in a reservoir holding 280,000 gallons and located beneath the filters. This reservoir will be connected to a new pump well just outside the pumping station, from which the present pumps will force the water to an existing 2,000,000 gallon reservoir and to the distribution system. Particular care has been given to arranging the piping so that the valve controlling the admission of raw water will be accessible.

The plant is designed for the use of alum and not for the use of lime and iron. The alum is to be mixed in two coagulant tubs located over the engine room, and will be introduced into the suction of the low lift pumps.

The coagulating basin is of concrete construction, 128 feet long and with an average width of 25 feet. It is divided by longitudinal walls so that the water must pass over a distance equal to twice the length of the tank. Baffle walls are placed every 20 feet to insure thorough mixing of the coagulant and to assist sedimentation. The elevation of the basin is such that the surface of the water in it will be only slightly above the surface of the water in the filters. This will permit the coagulated water to flow to the filters with a gentle velocity through large pipes without breaking up the coagulated masses.

The filters are eight in number, each 14 feet by 20 feet. Based on a six million gallon capacity for the entire plant, the rate of filtration would be the usual one of approximately 125,000,000 gallons per acre per day. The filters are arranged in four rows on either side of the pipe gallery. The filter units themselves consist of concrete boxes, in the bottom of which is laid a 7-inch by a 12-inch manifold or main collector. Rising from the top of this manifold at every six inches are malleable iron tees, from which extend at right angles to the manifold in either direction 1½-inch galvanized iron pipes perforated on the lower side with 7-32-inch holes spaced three inches apart. The space beneath the level of these laterals and the concrete bottom of the filter is to be filled with slag or broken brick tightly covered over with a layer of cement. The filtering material is to consist of sixteen inches of gravel graded from 1½-inch to 1-16-inch, on top of which will be placed 20 inches of filter sand having an effective size of 40 mm. and a uniformity coefficient of 1.6. Each filter is to be provided with a controller of satisfactory design, plans of which have been submitted.

Two wash water troughs of ample capacity extend the entire length of each filter and pass at the lower end over a weir, from which the dirty wash water will pass into a 14-inch main sewer.

The filters are designed for washing with water alone and without mechanical agitation with air or other devices. The strainer and collecting system has been made unusually large, therefore, to accomodate the high rate of wash water which is necessary when mechanical agitation is omitted. In addition, an extra amount of coarse gravel is to be placed in the filters to prevent the disturbance of the filtering material by the application of wash water at a high rate. Water for washing will be stored in a tank on the hill some fifty feet above the filters, and in this way ample volume and pressure is sure to be furnished when needed.

The plant is designed in all essential particulars in accordance with the latest approved practice, and if properly operated will doubtless give excellent results. There are certain devices, such as electrically or hydraulically operated valves and recording gages, which although used in some of the best plants cannot be considered essential in this case.

At a meeting of the State Board of Health, held January 22nd, 1908, these plans were approved upon the following conditions:

1st. That the management and operation of the plant, including the quality and amount of coagulant used, be at all times satisfactory to the State Board of Health; and,

2nd. That the valve controlling the emergency intake be kept locked and that the key to said valve be placed in a box with a glass front, the box to be fastened in a suitable place at the pumping station, and that this box be provided with a lock and one key only, this key to be kept by the health officer of the city.

REPORT ON PROPOSED AMENDMENTS TO PLANS FOR WATER PURIFICATION PLANT FOR ASHTABULA.

On July 16th, 1908, Mr. W. S. McKinnon, president of The Ashtabula Water Company, submitted plans drawn by the Norwood Engineernig Company, showing certain changes which it is desired to make in the plans already approved for a water purification plant for Ashtabula. These plans were referred to the chief engineer, who reported upon them as follows:

Complete plans for a water purification plant for Ashtabula, drawn by Messrs. Chapin and Knowles, were approved by the State Board of Health on January 22nd, 1908, with the following conditions:

> "1st. That the management and operation of the plant, including the quality and amount of coagulant used, be at all times satisfactory to the State Board of Health; and
>
> "2nd. That the valve controlling the emergency intake be kept locked, and that the key to said valve be placed in a box with a glass front, the box to be fastened in a suitable place at the pumping station, and that this box be provided with a lock and one key only, this key to be kept by the health officer of the city."

As the contract for the work has been let to the Norwood Engineering Company, which is a filter manufacturing company, it is now proposed to make certain changes in some of the features of design of the plant. The capacity, however, will remain the same. Plans showing these changes are accompanied by full specifications and a copy of the contract. The contract contains a guarantee of efficiency as follows:

> The filtered water shall at all times be bright and clear and free from turbidity, matters in suspension and colors visible to the naked eye.
>
> The filtered water shall show no more alumina than is shown in the raw water, nor shall it contain any undecomposed coagulant.
>
> The standard of purification to be accomplished and maintained shall be as follows:
>
> (a) When the raw water contains over three thousand (3,000) bacteria per C. C., the filtered water shall show an average reduction of not less than ninety-eight per cent. (98%).
>
> (b) When the raw water contains three thousand (3,000) or less bacteria per C. C., the filtered water shall show an average of not over one hundred (100) bacteria per C. C.
>
> (c) When the raw water contains over three thousand (3,000) bacteria per C. C., not more than five per cent. (5%) of the samples shall show a reduction of less than ninety per cent. (90%).
>
> (d) When the raw water contains three thousand (3,000) or less bacteria per C. C.,

not more than five per cent. (5%) of the samples shall contain more than one hundred and fifty (150) bacteria per C. C.

(e) When the filtered water shows one hundred (100) or less bacteria per C. C., the above guarantees as to purification shall be considered as having been fulfilled.

The changes from the plans already approved are as follows:

COAGULATING BASIN.—The basin now proposed will cover more area and will be shallower than that already approved. It will be uncovered, of concrete construction, and will have the following dimensions: 89½ feet by 50½ feet by 16½ feet. This gives a capacity of about 500,000 gallons. Based on a capacity for the plant of 6,000,000 gallons, the capacity of the basin will be about two hours' flow, which is the same as that of the basin already approved.

PUMP AND FILTER HOUSE. Iron trusses will be substituted for wooden ones in the pump house and filter house, and the former building will be enlarged.

CANAL SYSTEM. Instead of using a cast iron raw water pump, the raw water is to be conveyed to the filters through a concrete canal passing between the filters and over the clear well. The bottom of this canal is to have a double floor with drainage system between the floors to prevent leakage of raw water into the clear well.

FILTERS.—The number of filters will be the same as shown on the original plans, but the area of each will be increased by a very slight amount.

AIR WASH.—An air wash system is included in the present plans, whereas none was included in the plans as approved.

FILTERING MATERIAL. -The filtering material will be changed to correspond with the use of the air system; i. e., instead of 16 inches of coarse gravel there will be 9 inches of finer gravel. The depth and size of the sand will be the same.

RATE CONTROLLERS.—The Norwood Engineering Company's controller will be substituted for that already approved. The controllers will be placed in the same position as shown on the original plans.

VALVES.—Instead of ordinary gate valves there will be used the Norwood Engineering Company's combination operating valve, and a butterfly valve to control the influent to the filters.

LOSS OF HEAD GAGES.—A mechanical loss of head gage will be used instead of the glass tubes that were first proposed.

STRAINER SYSTEM.—The Norwood Engineering Company's strainer system, consisting of cast iron header of rectangular form, wrought iron laterals, and brass tubular strainers, will be substituted for the system shown on the original plans.

WASHING.—Instead of washing the filters by gravity from a storage tank on the hill, a 10-inch centrifugal pump with a capacity of 300 gallons per minute will be used.

The proposed amendments to the plans for a water purification plant for Ashtabula (approved January 22nd, 1908), as shown in drawings made by the Norwood Engineering Company and submitted by Mr. W. S. McKinnon, president of The Ashtabula Water Company, on July 16th, 1908, were approved by the Board on July 24th, 1908.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR ATHENS.

Application for approval of four wells to be used as an additional source of public water supply for Athens was received from Mr. A. R. Bell, superintendent of water works, on September 8th, 1908. The matter was referred to the engineering department, and the following report was made:

On May 14th, 1907, a general examination was made of the public water supply of Athens, in connection with the investigation of water supplies throughout the state. Reference is made to the report based upon this examination for detailed description of the supply and the water works equipment. The present report will review the most essential features relating to location of wells and quality of water.

In connection with the status of the Athens water supply with reference to actions of the State Board of Health, it may be recalled that while the original public supply was installed in 1894 and additional wells have been drilled as late as 1901 and 1902, the supply has never been submitted to the Board for approval as is required by law. The present action of the Board, therefore, should be such as to cover the old as well as the proposed new wells.

The proposed new wells recently drilled and indicated as Nos. 4, 5, 6 and 7 on accompanying sketch-map, are in the same general locality as the old wells and penetrate practically the same formation. Well No. 5, however, is unnecessarily near dwellings and should not be favorably considered. The description of the "Source of Supply" in the report above referred to will serve to indicate the character of the wells and is given as follows:

SOURCE OF SUPPLY.- The wells are located on a plot of ground owned by the city, about 200 feet square. As before noted, until the winter of 1901 and 1902 all water was obtained from one large well, 30 feet in diameter and 25 or 26 feet in depth, penetrating river drift. This proving insufficient, three deep drilled wells were sunk during the winter of 1901 and 1902. The old well was converted into a receiving reservoir and made watertight by placing in it a bottom of concrete two feet in thickness. In order to provide an emergency supply in case of the failure of the new wells or the necessity of pumping an increased quantity of water for fire protection, a space four feet in depth below the concrete bottom of the receiving reservoir was filled with large broken stone, into which was extended an additional suction from one of the pumps. During the severe flood which occurred in the month of March of the present year (1907), the bottom of the receiving well was damaged to such an extent that sufficient water could not be furnished to the city. Repairs are now under way.

The material penetrated by the new wells is as follows:

Earth and clay	18 feet.
Waterbearing gravel	20 feet.
Blue soapstone rock	10 feet.
Waterbearing sandstone	4 feet.
Blue soapstone	13 feet.
Waterbearing sandstone	3 feet, 6 inches.
Blue clay and soapstone	41 feet, 6 inches.
Total	110 feet.

Each well is provided with an 8-inch casing, extending to a depth of 38 feet, or until the first layer of blue soapstone rock is reached. The lower sixteen feet of these casings is perforated to admit water from the waterbearing gravel found at this depth. It appears, therefore, that most of the water is derived from the same stratum as in the case of the old well. The additional depth was provided for the admission of air lift pumps which are used in raising the water from the new wells. When the wells are not being pumped, the water stands at a depth of about 22 feet below the surface of the ground. The air lifts are of the Baker type and consist of 4-inch pipe within a 6-inch pipe, the air under pressure being supplied to the annular space between the two pipes and the water rising through the 4-inch pipe. The 6-inch and 4-inch pipes extend below the surface of the ground to a depth of 108 and 106 feet, respectively.

In September of 1902 a pumping test was run on the new wells, during which it was found that pumping at the rate of about 600 gallons per minute or 870,000 gallons per twenty-four hours, the wells were lowered 5 feet 9½ inches in fifty minutes. Complete records of the test could not be obtained, but it was understood that continued pumping at the same rate lowered the level of water in the wells but slightly. The amount obtained during the test is sufficient for the present needs of the city.

Within 200 feet of one of the new wells are several residences maintaining outdoor privies. These are a decided menace to the purity of the public supply and should be reconstructed with removable watertight receptacles placed at or above the surface of the ground, and frequent inspection of same should be made by the village authorities to see that they are properly cleaned and kept in the best possible sanitary condition.

The analyses of the old wells as well as the discussion of the quality of the water based upon these analyses, contained in the report on the general examination of the existing public water supply, will also be applicable to the new wells and is given as follows:

QUALITY OF WATER.—Two analyses of samples of the public water supply of Athens have been made by the State Board of Health, namely, those collected March 30th, 1903, and May 14th, 1907. Both analyses indicate the influence of contamination, yet it is shown that the purification effected by the passage of the water through the ground is complete and renders the water unobjectionable for a public supply. The contaminating influence is probably due to the proximity of the neighboring privies, above referred to, but may also be due in some measure to the practice of manuring fields in the vicinity. The danger of injurious contamination in the latter case is considerably less than in the case of the nearby privies. The number of bacteria is very low and the colon bacillus was not present. The water is somewhat hard and contains at times a large amount of incrusting constituents, which would render it somewhat objectionable for manufacturing purposes.

At a meeting, held October 20th, 1908, the State Board of Health approved of the present water supply of Athens, and an additional supply to be obtained from wells Nos. 4, 6 and 7, as shown on sketch of plans on file with the Board, provided:

1st. That all privies within 500 feet of any of the public supply wells be constructed and maintained in such manner as to prevent any contamination of the surrounding soil, and that their method of construction and maintenance be approved by the State Board of Health.

2nd. That any sewer laid within 500 feet of the public supply wells be constructed in a special manner to be approved by the State Board of Health, with a view to preventing the contamination of the surrounding soil.

3rd. That no new well be placed in use without the approval of the State Board of Health.

4th. That any or all of the wells be abandoned whenever in the opinion of the State Board of Health the water shall have become dangerously contaminated.

The Board disapproved of the proposed additional supply from well No. 5 on account of its objectionable location.

REPORT ON PROPOSED WATER SUPPLY FOR BEACH CITY.

On June 23, 1906, a communication was received from Mr. A. B. Wingate, village clerk of Beach City, requesting that a representative of the State board of Health visit Beach City for the purpose of making an investigation in connection with a proposed water supply. In the course of a few days the engineer of the State Board of Health visited Beach City, and with the assistance of the local authorities selected a site for water works wells which he deemed would be satisfactory to the State

Board of Health. Plans were drawn up for the construction of the water works, but owing to the oversight of the consulting engineer, Mr. L. E. Chapin of Canton, Ohio, these plans were not submitted to the State Board of Health for approval. On March 20th, 1907, one of the assistant engineers visited Beach City and found the construction of the water works in progress, but not sufficient work was done to indicate the general arrangement of the water works system. Following this visit, several requests from the State Board of Health were sent to the consulting engineer for detailed information of the plans for the water works. These requests were not complied with until the latter part of 1907, when the water works had already been placed in operation. In as much as the location of the public supply wells would seem to insure a satisfactory quality of the water, the matter was not actively taken up by the engineering department owing to press of other work. Recently, however, one of the engineering assistants was instructed to visit Beach City for the purpose of obtaining detailed information in connection with a general investigation of water supplies throughout the state. The following report is based upon the notes submitted by the engineering assistant and other sources:

The village of Beach City is located in the southwestern portion of Stark County on Sugar Creek, a small stream which joins the Tuscarawas River about 12 miles below the village. The population of the village, according to the best estimates that can be obtained, is between 500 and 600. The area within the corporation limits is approximately 0.3 square mile, practically all of which is on the southeast bank of Sugar Creek. The general topography of the surrounding country may be described as gently rolling, though the valley of the creek has been deeply eroded and has very steep slopes. Beach City lies about on a terminal morain of the glaciers, and the glacial deposits in this vicinity have a considerable thickness. It is said that an average geological section within the village of Beach City would show 4 to 6 feet of surface soil of a sandy or gravelly nature, below which is from 6 to 30 feet of gravel. Below this gravel is found a layer of so-called hardpan, which seems to consist of sand and gravel firmly cemented together. This hardpan varies in thickness from about 3 to 30 feet. Below the hardpan comes another stratum of gravel of indeterminate thickness. All of the above mentioned deposits constitute the glacial drift. Below these are found alternating strata of limestone, shale and slate, with an occasional seam of coal. Recently shafts have been sunk in the vicinity of Beach City for the purpose of mining this coal. This fact is interesting, since it is possible that a coal mine in the vicinity of the public supply wells may cause these wells to greatly diminish in yield.

Beach City is primarily a farming center, though it contains several small industries.

In general the village presents a neat and clean appearance, though none of the streets are paved. There are no sewers in Beach City with the exception of a few private drains. Since the introduction of the public water supply and the consequent more extensive use of modern plumbing, the need of a suitable system of sanitary sewers has been felt. At the present time numerous cesspools are being constructed for the purpose of caring for the increased quantity of sewage, and it is possible that these may in time be a menace to the quality of water from private wells. At present, there are 25 or 35 private wells in use, most of which are drilled, owing to the difficulty of excavating in the loose gravel deposits underlying the village. So far there has been little indication of the contamination of private wells, though several such wells a few years ago were suspected of having been the cause of a prevalence of typhoid fever in the eastern part of the village. A sample was collected from one of these wells, 30 feet deep, and in the vicinity of several privies and other possible sources of pollution. It was not possible to obtain enough data to indicate definitely from what horizon the water reaching this well was derived, but it bears a striking resemblance to the water in the public supply wells and would therefore seem to come from below the practically impervious stratum of hardpan already mentioned. Notwithstanding the proximity of sources of pollution, the quality of the water as indicated by analysis is very good and in no way inferior to that from the public supply wells. This private well is described somewhat at length as an indication of the immunity from contamination of the public supply wells, as will be seen later.

INSTALLATION OF SUPPLY AND INVESTIGATIONS OF THE STATE BOARD OF HEALTH.

Early in 1906 it was determined by the local authorities to install a public water supply for the village. Messrs. Chapin and Knowles were engaged as consulting engineers and the works were built under their direct supervision. Pumping was first begun July 1st, 1907.

The first searches for water were made in the northeastern part of the village near the Bank Street bridge and on the northeast bank of the creek. An inspection of the site was made by the chief engineer of the Board in June, 1906, and was by him pronounced unsatisfactory. In a letter from the Secretary of the Board under date of July 2nd, 1906, the village authorities were advised to seek a new source of supply in the valley of Sugar Creek, to the northward and on the opposite side from the village. Owing to the difficulty of obtaining land in this vicinity, a compromise was effected on land in the same general vicinity, but on the village side of the creek. An inspection of the works under construction was made by one of the assistant engineers, March 20th, 1907, but no report was submitted pending the receipt of additional information from the consulting engineer. On August 6th, 1908, one of the engineering assistants was directed to visit Beach City and make a detailed examination of the public water supply in connection with a general investigation of water supplies throughout the state. No formal action relative to the approval of the supply has yet been taken by the State Board of Health.

SOURCE OF SUPPLY.

The village owns for water works purposes a tract of land three acres in area, which constitutes the northern portion of what is known as the John Adams lot. This property lies on the southwest bank of Sugar Creek and just west of the Canton and New Philadelphia Electric Railway. There are three 8-inch wells, all of which are located within about 5 feet of the water's edge of Sugar Creek and about 30 feet apart. The nearest source of possible pollution to the wells is a house 400 feet distant and to the southward. Sugar Creek receives a minor amount of pollution from houses upon the watershed, but this is not sufficiently great to render the water of the creek a menace to the public supply wells. All of the wells are 37 feet deep, and according to the well driller, penetrate 3 to 4 feet of tough blue clay, 9 to 12 feet of gravel and sand, 3 feet of hardpan and the remainder of the way, waterbearing gravel. The casings are not provided with strainers or other devices for preventing the entrance into them of sand or silt. Suction pipes 4 inches in diameter extend down inside the casings to within 7 feet of the bottoms of the wells. These suction pipes join in a 6-inch main suction which leads to the pumping station nearby. The tops of the wells are hermetically sealed so as to prevent the entrance of surface water. Further protection to the tops of the wells is afforded by solid blocks of concrete placed about each, which, it is believed, are sufficient to resist the action of flood waters in the creek. Provision has also been made for backflushing the wells when trouble is encountered by the entrance of considerable quantities of sand or silt. It has been found by experience that this backflushing is necessary at rather frequent intervals. The water entering the wells is all derived from the gravel below the hardpan, and this water when the wells are not being pumped rises to within about 14 feet of the top of the well casing. This is some feet below the level of the water in the creek, which would indicate that the well supply is not influenced by the creek, water or the ground water nearer the surface. The water is pumped directly from the well by means of a Fairbanks-Morse simple horizontal duplex pump having a capacity of about 500,000 gallons per 24 hours. This pump, together with the boiler and other necessary pumping station equipment, is located in a neat brick building on the water works property adjacent to the wells. The total length of mains at present laid is about two miles and consists entirely of 6-inch and 4-inch cast-iron pipe. Fire protection is afforded by twenty-two double fire hydrants. At the present time there are about

60 service connections to the public water supply, all of which are in use. Storage of water and equalization of pressure in the mains is effected by an elevated steel tank located near the pumping station. This tank has a capacity of about 40,000 gallons. No records are kept of the amount of water pumped, but a rough estimate would indicate the average daily consumption to be about 22,000 gallons.

QUALITY OF WATER.

During the recent investigation, two samples were taken of the public water supply and one of a private well, which has already been mentioned. One of the samples of the public supply was taken at the pumping station as near the wells as possible; the other was taken from a tap within the village at a considerable distance from the pumping station. The analyses of the two public supply samples are practically alike, though the latter shows a small increase in chlorine content and a slight reduction in iron content as compared with the former. From a physical point of view the water is very satisfactory, being free from turbidity and sediment and practically free from color. The water is rather hard, though practically all of the hardness is in the form of carbonates. The findings (including bacterial determinations) indicative of organic contamination are all very satisfactory. While the public water supply meets with general popular approval, cistern water is to a large extent retained in use for general domestic purposes. There has been more or less unintelligent criticism from time to time, owing to the presence of minute air bubbles in the water which give it a milky appearance.

Sample of the private well has already been discussed.

At a meeting of the State Board of Health, held December 10th, 1908, these plans for a public water supply for Beach City, as shown on drawings prepared by Mr. L. E. Chapin, consulting engineer, were approved, provided:

1st. That no house or possible source of pollution be permitted within 400 feet of any of the wells.

2nd. That no new wells be installed without first obtaining the approval of the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR COALTON.

Under date of June 15th, 1908, a communication was received from Mr. James Duncan, mayor and health officer of Coalton, requesting approval by the State board of Health of water from an abandoned mine for use as a public supply. At the request of the Secretary of the Board a sample of the water was collected by Mr. Duncan and submitted to the laboratory for analysis. This analysis not proving entirely satisfactory and giving evidence of improper collection of sample, a representative of the engineering department visited Coalton on August 17th, 1908, made a general examination on the ground and collected an additional sample. The following report was submitted:

The village of Coalton lies in the north-central part of Jackson County, in the valley and near the head waters of Pigeon Creek, which stream flows in a west-northwest direction through the central portion of the village. About fifteen miles to the westward, the creek discharges into the Scioto River. The village is surrounded by hills forming the side of Pigeon Creek valley and ranging in height from 75 to 100 feet. The population of the village, according to United States census reports, was 1,459 in 1890 and 1,625 in 1900. There has been no increase in population since 1900, and it is even probable that there has been a decrease.

Coalton is primarily a coal mining town and contains no manufactories of any sort. Owing to the fact that most of the coal seams in the vicinity have been worked out, even the mining industry is on the rapid decline.

The village as a whole presents a rather slovenly appearance. The streets are narrow and improved to but a limited extent. The sidewalks are generally of wood and such of the roadways as have been improved at all are paved with limestone macadam. The houses are generally small and the premises carelessly kept. It is the common practice to maintain hogs within the built up portion of the village.

There is no sewerage system, and surface drainage as well as more or less sink drainage and other liquid wastes finds its way into Pigeon Creek either directly or through open ditches.

Water for domestic use is obtained from shallow wells which derive their supply from a sand or gravel stratum from 9 to 13 feet below the surface. These wells are often in close proximity to privies, which latter as a rule are poorly built. Ordinarily a vault is dug 5 to 6 feet in depth and lined with boards or masonry loosely laid.

It is said that every autumn the village is visited by a prevalence of typhoid fever, and while no accurate records are kept, it is estimated that the yearly number of deaths from this cause is about five, which may be taken to represent about 50 cases.

It is plain from the above that the sanitary conditions of Coalton are far from what they should be and that a pure water supply is a much needed improvement.

PROPOSED WATER SUPPLY.

It is proposed to pipe the water from an abandoned mine to a public fountain to be located near the center of the village. This abandoned mine is located about one-fourth of a mile south of the village on the eastern slope of one of the hills bordering Pigeon Creek valley. The water emerges from an old side entry (probably used for ventilation) on the farm of a Mrs. Hipple. The main entry, which is several hundred feet to the southward, has caved in and is not accessible. It is claimed that the mine has not been worked for some fifteen or twenty years. The exact source of the water could not be ascertained, but presumably it percolates through the strata overlying the coal, finds its way through the roof of the mine, and is intercepted by a stratum of impervious shale immediately underlying the coal. This shale has such a slope and is warped in such manner as apparently to cause a large part of the water in the hill to flow toward the old entry from which it now emerges.

There would be no objection to the use of this water provided the abandoned mine is not at any time broken into by a neighboring mine, which is now being worked in the same hillside. The entry to this neighboring mine is on the property of Mr. Fred Scott, about 500 or 600 feet to the northward. At the present time this mine has been worked into the hillside a distance of 200 to 300 feet, and but a few chambers have been worked out. At the time of investigation, there seemed to be a great conflict of opinion relative to the extent to which it was proposed to work the Scott mine. Some claimed that a large force of men was to be employed and that it would be but a matter of comparatively short time before connection would be made to the old mine from which it is proposed to derive the public water supply. Others maintained that only small quantities of coal would be taken out from time to time, and that there was no danger of connection ever being made to the old mine. In view of the above, the only safe procedure would be for the village in some manner to obtain control over the Scott mine, that the mining operations therein would be kept well away from the old mine.

The mode of developing the water supply is as follows: It is proposed to build a collecting well about 7 or 8 feet deep and 4 or 5 feet in diameter, at the mouth of the entry. This collecting well is to be constructed of brick with a layer of about 6 inches of cinders or fine crushed stone placed about the outside, and the top is to be protected with an ordinary manhole cover. The water from the mine is expected to percolate into the collecting well through the cinders or crushed stone and brick, thus removing any turbidity which might exist. It is also thought by the local authorities that this method of collecting the water will effect a purification which will remove any injurious germs, but such a mode of filtration can hardly reach this efficiency. From the collecting well the water will be piped a distance of 1,750 feet to a public fountain in the center of the village. The available head to force the water through this length of pipe is from 20 to 25 feet. It is not proposed to make any service connections either for private or public purposes, and the water will be available to the public only at the fountain.

QUALITY OF WATER.—The first sample collected by the mayor on July 23rd, 1908, indicated as far as the chemical analysis was concerned a water of satisfactory quality from a sanitary point of view, but the bacterial analysis on the other hand showed an excessive total count (11,125 per cubic centimeter) and the presence of the colon bacillus. It was subsequently learned that the excessive number of bacteria and the presence of the colon bacillus was probably due to the unsatisfactory way in which the sample was obtained. Analysis of the later sample, collected on August 17th, 1908, by a representative of the State Board of Health, gave the same general chemical content as the previous analysis, though the indications were somewhat less favorable. The bacteria, however, numbered but 550 per cubic centimeter (which under the circumstances is not excessive) and there was no appearance of the colon bacillus.

At a meeting, held October 20th, 1908, the State Board of Health approved plans for a proposed water supply for the village of Coalton, to be obtained from an abandoned mine located on the property of Mrs. Hipple, about one-fourth mile south of Coalton on the eastern slope of one of the hills bordering Pigeon Creek, provided:

1st. That the mine entry be carefully closed to prevent the entrance of persons or animals.

2nd. That the collecting well be protected from surface contamination.

3rd. That the village obtain a guarantee that the Scott mine will not be worked within 75 feet of any of the galleries or chambers of the abandoned mine proposed for public water supply purposes.

REPORT ON PROPOSED WATER SUPPLY FOR DRESDEN.

Plans for proposed water supply for Dresden were submitted May 27th, 1908, by Mr. Horace D. Munson of Zanesville, consulting engineer for the village. The chief engineer visited Dresden on June 2nd, 1908, and again on June 23rd, for the purpose of investigating the proposed supply. On July 15th, 1908, revised plans showing the location of the well finally chosen were received from the consulting engineer. These plans were examined by the chief engineer and the following report was made:

Dresden is a village of about 2,000 population, located in the northerly part of Muskingum County on a level strip of land lying between the hills of the Muskingum River. The Ohio Canal passes through the village. Dresden is principally a small trading center and there are no important industries.

At present the village has no public water supply nor sewers, except perhaps one or two private drains and the canal.

In April, 1908, Dresden started work on new water works. Instead of having complete plans prepared and the source of supply approved by the State Board of Health before beginning work, the village commenced at once to purchase and lay water pipe in order that the local unemployed labor could be utilized. After the distribution system was partly laid, a well was driven in the westerly part of the village near the edge of town, and approval of its location was requested. The chief engineer went over the ground with the local officials and consulting engineer, and informally advised against the location as being too near the village.

Another well was sunk several hundred feet beyond the westerly limits of the village, but no water was found. Accordingly, a supply was sought on the opposite side of the village toward the Muskingum River, and a test well was driven in the bottom land some 200 feet east of the canal and between Sixth and Seventh Streets. This well is 50 feet deep and, except for the top soil, passes through sand and gravel. The indications are that the supply of water is abundant. The location of the well is reasonably removed from habitation and has the advantage that all surface wash from the village will be intercepted by the canal.

Analysis of sample from the well, which accompanies this report, shows the water to be safe from a sanitary standpoint, although it contains an amount of iron which may be objectionable if not removed, and it is also somewhat hard for industrial or domestic purposes. However, in view of the fact that the village contains no important industries, the hardness of the water may not be a seriously objectionable feature. Furthermore, the private wells in town are said to be harder than the proposed supply, so that the people will not necessarily be driven to the use of contaminated private wells on account of the hardness of the public supply.

The pumping station is to be located on the high land adjacent to the wells, and the water will be forced through an 18-inch main to a reservoir located on a hill immediately west of the village. This reservoir is formed partly in excavation and partly by embankments. It is stated that the reservoir will be covered, though no provision for covering, except roof columns, is shown on the plans.

July 24th, 1908, the Board voted to approve these plans, provided:

1st. That the wells be relocated in a position farther removed from the village, if at any time this should be deemed necessary by the State Board of Health; and,

2nd. That the reservoir be covered in a manner satisfactory to the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR GIRARD.

The village of Girard is located in Trumbull County on the Mahoning River. Its population is stated to be about 4,000. The village contains several industrial establishments, among which are included a large iron furnace located in the river valley; a steel mill in process of construction; and large leather works just north of the center of the village. A considerable increase in population is contemplated when the steel mill is completed. The village has several sanitary sewers discharging into the Mahoning River at different points, although a sewage purification plant is now contemplated which will eventually require that all the sewage be carried to one point, where a disposal plant will be constructed. There is at present no municipal water supply and most residences are provided with dug or drilled wells.

PRELIMINARY INVESTIGATIONS FOR PROPOSED WATER SUPPLY.

During 1906 and 1907, several sources were investigated by the State Board of Health as to their availability as a source of public water supply for the village. Among these are included Little and Big Squaw creeks, Four Mile Run, and several drilled wells. The supplies of surface origin from the run and the creeks were discarded, owing to the fact that impounding reservoirs and purification plants would be required were these supplies developed. Analyses made by the State Board of Health of samples from test wells drilled in the valley of Little Squaw Creek, indicate a water of unsatisfactory quality as regards hardness and chlorine contents.

GRANTING OF FRANCHISE.

In the fall of 1908, the Girard council passed an ordinance granting a franchise for a water supply for the village, to The Scholl Engineering Company of Youngstown. In this franchise it is stated that the water shall be of a quality satisfactory to the State Board of Health; that the machinery shall have a capacity sufficient to pump at a rate of 500,000 gallons in twenty-four hours against a pressure equivalent to 200 feet of head, and that a standpipe of not less than 200,000 gallons capacity shall be provided. It is stated that the water may be obtained from any source wherever a sufficient quantity of good and wholesome water may be obtained for all said purposes, other than from the Mahoning River, but that in the future, if all other supplies are inadequate, the Mahoning River may be used with the consent of the village council and of the State Board of Health; and that a connecting main with the Mahoning River may be constructed, established and maintained at any time with proper valves and devices, which shall be used only in case of fire and when the water from the regular source shall have failed.

PRELIMINARY EXAMINATION OF AUGUST 28, 1908.

The Scholl Engineering Company requested an examination of the proposed sites for test wells in order to have the approval of these sites by the State Board of Health before construction was commenced. On August 28th, 1908, one of the assistant engineers visited Girard to inspect the proposed sites and to collect samples from an existing well and from a flowing spring in this locality.

The first sample was from a blasted well on the property of Duane Greenwood, 3,800 feet from State Street and at an elevation of 155 feet above the doorsill of the town hall. This well is 4 feet in diameter and 22 feet deep. The upper 6 feet is excavated through soil, while the remaining 16 feet is through sandstone shale. The water stands at a depth of 6 feet below the surface of the ground.

A second sample was obtained from a flowing spring on the Tibbett property, about 5,000 feet from State Street and 100 feet from Churchill Road. Its elevation is not very different from that of the first well. Water stands in this spring nearly to the surface of the ground and is carried by a 2-inch pipe to a watering trough on the side of Churchill Road. This pipe flows constantly about one-half full. There is a second pipe, also, which carries water to a trough in an adjacent pasture.

The analyses of these samples are appended to this report. When collected, the water from both wells was clear, cold and odorless, and of excellent appearance and taste. The analysis of the sample from the blasted well indicates a water of high temporary hardness, but without permanent hardness. The high nitrate and chlorine contents, together with the presence of coli in 50 c. c. of the sample, indicate a pollution of the water. This pollution is probably due to the location of the well in the immediate vicinity of a dwelling which is not more than 50 feet distant. Such pollution is not to be expected in water obtained from driven wells in this vicinity when properly located. The analysis of the sample from the surface spring indicates a water of exceptionally good appearance and there is no evidence of either past or present pollution. The determination of especial note is that of incrustants, or permanent hardness, which are present to the extent of 205 parts per million. In all other respects this water is very satisfactory.

As the results of the analyses of the samples collected August 28th, 1908, indicate a water of satisfactory quality, further tests as to the availability of a ground water supply in this locality were made by sinking a test well on a lot opposite the Tibbett property and now owned by William Cross, Jr. The nearest house is about 700 feet distant, and there are no other visible sources of pollution within one-quarter of a mile.

QUALITY OF WATER.

A sample of water was taken from the well at about 10 a. m., and bacterial counts were obtained from plates poured at Girard soon after collection. The remaining analyses were obtained from samples shipped to the laboratory at Columbus.

When collected, the water was clear and had a temperature of 11 degrees C.; the corresponding air temperature was 4 degrees C. Before shipping from Girard, however, and approximately two hours later, the water had become cloudy and contained a white precipitate. When received at the laboratory the following morning, there was a heavy sediment, evidently due to the precipitation of iron. The water had also a taste characteristic of iron bearing waters, and a distinct earthy odor.

The result of the analyses indicate that the water was of a quality in many respects similar to those samples obtained on August 8th, 1908, from neighboring property. The sanitary analysis indicates an unpolluted water, although one that is somewhat hard. The iron content, however, is so great as to make the water objectionable for domestic use without its removal.

December 28th, the Board approved the above proposed water supply, provided:

1st. That an iron removal plant satisfactory to the State Board of Health be installed before the water is delivered to consumers.

2nd. That plans showing complete water works system, including the land owned or controlled for present and future wells, be submitted to and receive the approval of the State Board of Health.

REPORT ON PROPOSED EXTENSION OF WATER SUPPLY FOR THE VILLAGE OF HIRAM.

On November 19th, 1908, a request from officials of Hiram for privilege to extend their water supply was received by the State Board of Health, and was referred to one of the assistant engineers, who visited Hiram on December 2nd, 1908, to make the necessary investigation and reported as follows:

The village of Hiram is located in Portage County, about 40 miles south of the city of Cleveland. It is a college town, the seat of Hiram College, and has no manufacturing industries. The present population of the college is 280, while the total population of the village is said to be about 610, a figure which is somewhat decreased in the summer when the college is closed.

The village has no municipal system of sanitary sewers, but there are one or two private drains; one of which empties into a ravine at the head of a branch of Silver Creek. (See engineer's report, 1905 Annual Report, page 196.) The village has a municipal water supply, installed in 1897.

DESCRIPTION OF WATER WORKS.

Briefly stated, the water works comprise two springs used as a source of supply; a receiving well to which water flows by gravity; a pumping plant, standpipe and distribution system. The pumping plant is located adjacent to the wells and is about one mile north of the center of the village. From this plant, water is carried by a 4-inch force main to the standpipe, which is located about half way to the center of the village and on the top of the divide which separates the valleys of the Cuyahoga and Mahoning rivers.

SOURCE OF SUPPLY.—The springs which are used as a source of supply are two in number and are at the head of a small stream which flows into the Cuyahoga River. Water outcrops from a sandstone shale, and at the points of emergence from the róck are constructed two small concrete chambers where the water is collected and from which it flows by gravity into the receiving well.

RECEIVING WELL.—The receiving well is a covered basin about 30 feet in diameter and with a total depth of 15 feet. At the time of inspection, December 2nd, 1908, the water in the well was approximately 4 feet deep. It was clear and of very satisfactory appearance.

PUMPING PLANT.—The pumping station is a neat brick structure. It contains a gasoline engine used to drive the power pump, by which water is forced into the standpipe and distribution system. The power pump is of the Deming type and has a capacity of 250,000 gallons in twenty-four hours. The gasoline engine is built by the Hamilton Machine Works of Hamilton, Ohio.

STANDPIPE.—The standpipe is a steel tank 12 feet in diameter by 60 feet high, holding 50,000 gallons. It is located at such a height that the usual pressure in the mains is about 75 pounds per square inch.

DAILY CONSUMPTION.

As shown on the superintendent's reports, the average daily consumption at Hiram is about 15,000 gallons. This was stated to be the consumption on December 2nd, also, and was said to require two hours' operation of the pump.

Since the date of installation of the plant in 1897, there has never been any difficulty in obtaining a sufficient quantity of water for the needs of the village, but, during the late fall, the flow from the springs has been unusually small. On this account, it has been necessary to curtail the use of the water at Hiram, and the consumers have been requested not to use any in bath tubs.

PROPOSED ADDITION TO SUPPLY.

On account of the present shortage of water, it is desired to increase the available supply by using the flow in the ravine into which the two springs used as a source of supply formerly discharged. An examination of this ravine was made during the recent inspection, and it was apparent that the supply of water, which amounted to perhaps 10,000 gallons daily, was furnished by the outcropping of ground water in the ravine at various points, all within about 100 feet above the springs. It is apparent that this water has the same source as that now used. There are no residences nor other visible sources of pollution of the supply within one quarter of a mile, and there is good reason to believe that this water would always be of satisfactory quality, except immediately following local rains. It is the intention of the Hiram officials to carry this water by means of an open channel into a small basin similar to that now used for the other two springs, and to carry it by gravity through a pipe to the receiving well. Provision will be made for closing this pipe during threatening or rainy weather.

At a meeting of the State Board of Health, held December 10th, 1908, plans for an additional water supply for the village of Hiram, to be obtained from a ravine located about 50 feet from the present pumping station, were approved; provided, that precautions be taken to eliminate all surface water from the supply; and that the additional supply be used only as an emergency supply.

REPORT ON PROPOSED WATER SUPPLY INTAKE FOR HURON.

A letter was received on November 27th, 1908, from Mr. L. E. Chapin, consulting engineer, requesting the approval of one of three proposed locations for an intake to a new water works system for the village of Huron. One of the assistant engineers visited Huron on December 2nd, in order to examine the local conditions, and submitted the following report:

The village of Huron is located in Erie County in the north central part of Ohio on Lake Erie. Its population is said to be about 1,700. It contains a terminal of the Wheeling and Lake Erie Railroad, and the officials of this road intend to make the village an important shipping point for ore. The industries of the village comprise an ore handling plant and dock at the mouth of the Huron River.

The village at present has no municipal water supply nor system of sanitary sewers. Most residents are provided with shallow dug wells and privies or dry vaults. In 1906 two sanitary sewers were installed, varying from 12 to 24 inches in diameter, one on South Street and the other on Main Street. Both have a common outlet through a 24-inch pipe which discharges into the Huron River at the foot of South Street, and 1,300 feet from the inner end of the breakwater at the mouth of the river. (See Annual Report of the State Board of Health, 1905, page 143.) This outlet was inspected on December 2nd, 1908. It was apparently 2 feet above the level of the water in the river and was discharging no sewage. It was stated that there is usually no flow in the sewer except when the closets in the public school are flushed.

Besides the above mentioned sewers there are several private drains which also discharge into the river, and among which may be mentioned one from each of the railroad stations and several from private residences. The river also receives the sanitary drainage from the villages above Huron, including Norwalk and Milan, so that the stream is always dangerously polluted and is unfit for use as a source of public water supply without purification.

PROPOSED WATER WORKS.

The proposed water works embrace the construction of a pumping plant, distribution system, and a purification plant of the mechanical type. It is intended to abandon the present electric light plant and to include the construction of a new electric light plant together with the new pumping station.

AVAILABLE SOURCES OF SUPPLY.

Three locations for the pumping plant and intake for the water works have been considered, namely, one on the Huron River near the present drawbridge of the Lake Shore and Michigan Southern Railroad; one 1,900 feet to the west of the west breakwater at the mouth of the river on the shore of the lake, and one about 1,600 feet to the east of the east breakwater also on the shore of the lake. At the first location it is proposed to take water directly from the river, while at the other two it is proposed to build a cast iron intake extending about 1,000 feet from the shore line into the lake. At the westerly location it is proposed to extend the intake at an angle of about 45 degrees with the present shore line and very nearly in a due northerly direction; while at the easterly location it is proposed to extend the intake at approximately right angles to the shore and in a northeasterly direction. The westerly location was the the one recommended by the consulting engineer in his report to the village.

CONDITIONS GOVERNING CHOICE OF LOCATION OF PLANT.

As previously discussed, the first location necessitates the use of river water to be purified by mechanical filters, together with preliminary coagulation and sedimentation. During the inspection of December 2, the officials were advised that in all probability the Board would not consider this location; that the conditions at Huron were practically identical with those at Vermillion, where subsequent operation of the plant had confirmed previous recommendations of the Board to use lake water in preference to river water. The river water is not only considerably polluted, but at times is also very turbid and is frequently much harder than the water in Lake Erie.

The westerly location was recommended by the consulting engineer, presumably on the ground that the prevailing currents in Lake Erie are toward the east, so that, with this location, there is little danger of pollution of the raw water by currents from the river. To the west of the breakwater, however, there is a constant erosion of the shore of the lake. The present banks of the lake are about 10 to 15 feet above the level of the water in the lake, and there is said to be a recession of several feet of the shore line yearly, due to wave action. It is possible, however, to construct the pumping station at such a distance from the shore that this feature need not be considered.

Another feature governing this location is the fact that there is no railroad spur near the proposed site, so that unless coal may be brought by the Lake Shore Electric Railway, which runs within one or two hundred feet of the proposed location, it will be necessary to cart all the coal used at the plant.

At the easterly location, two of the features mentioned above need not be considered; namely, there is no erosion of the shore at this point and there are several spur tracks within a short distance of the proposed site. As is well known, however, the prevailing currents of the lake are toward the east, so that with the plant on the easterly side of the mouth of the river it would be necessary to so locate the intake as to avoid a possible pollution of the raw water by the Huron River. This could be accomplished by locating the intake well within the outer end of the present breakwater, or by carrying the intake out into the lake to a point beyond local influence. With the first location, namely, inside the end of the breakwater it would be necessary to treat a more turbid water, due to the fact that the marginal water is more continually turbid on account of wave action. Evidence obtained during the recent special investigation by the State Board of Health has shown, however, that at Elyria, Lorain and Vermillion the turbidity in the lake water caused by wave action does not noticeably increase the expense of operating the filter plants. The location beyond the influence of local pollution by the river would necessitate considerably greater first cost of installation.

Another feature to be considered, especially with reference to the westerly location, is the future installation of a sewerage system for Huron, which will undoubtedly soon follow the installation of water works. A considerable portion of the drainage of the village will doubtless be carried into the Huron River without purification, but there is also a small settlement to the west of the village called Oklahoma, where there are at present 54 families. A ravine separates this settlement from the village proper, and it will be impracticable to carry the drainage from this district into the river without pumping. The sanitary drainage from Oklahoma will probably be discharged into the above mentioned ravine, which empties into the lake near the proposed westerly location of the water works. It is to avoid possible pollution from this creek that it is proposed to construct the intake pipe at about 45 degrees to the shore, rather than at right angles, as with the former location, the intake will be to the west of the creek.

CONCLUSIONS AND RECOMMENDATIONS.

At Conneaut, Lorain, Elyria and Vermillion there are water purification plants for which the supplies are taken from Lake Erie. All of these several municipalities are located at the mouths of rivers which receive the greater part of the sanitary drainage from the respective municipalities, and, in some instances, considerable drainage also from other communities on the watershed of the streams. At the several plants the intakes are located to the west of the mouth of the river and generally about one to two thousand feet from the shore. Experience at each plant has shown that normal Lake Erie water is unpolluted; and moreover, that the prevailing winds are from a westerly direction, causing a westerly movement of the water in the lake. Under such conditions the polluted river waters are carried away from the intakes. During easterly winds, however, conditions are reversed and the polluted waters are frequently carried over the intakes. Under such conditions the raw water is dangerously polluted. Records of the weather bureau of the U. S. Department of Agriculture have shown that for a period of fifteen years, 69 per cent. of the winds at Detroit and 43 per cent. of the winds at Cleveland were from a westerly quarter. (Ref. W. B. No. 262, Bulletin J.)

Conditions at Huron are similar to those at the several places above mentioned. The river water is dangerously polluted and is not fit for use as a source of public water supply. As shown in the accompanying report there are considered two possible locations for the proposed water supply for Huron, using Lake Erie as a source, and while at present either location would probably give a nearly equal quality of raw water, it is necessary to consider the possibility of an occasional serious pollution of the lake water following the future installation of a sewerage system for Huron. Moreover, there are economical and structural features to be considered and which recommend the selection of the site east of the mouth of the river.

The State Board of Health on December 16th, 1908, approved of plans for the location on an intake for a new water supply for Huron some 1,900 feet west of the westerly breakwater and west of the mouth of the First Cove, with the understanding that the action of the Board at this time is simply in regard to the location of the intake; that the water is to be filtered; and that full detailed plans for the filtration plant and water works shall be submitted to the Board for approval as soon as the same are prepared.

REPORT ON PROPOSED WATER PURIFICATION PLANT FOR JEFFERSON.

On April 11th, 1908, there were received from Mr. L. E. Chapin of Canton, consulting engineer for Jefferson, detailed and revised plans for water purification plant for that village. These plans were referred to the chief engineer, who submitted the following report:

In June, 1907, plans for a new water supply, including general plans for water purification works, for Jefferson were approved by the State Board of Health, provided:

1st. That the management and operation of the plant, the use of the coagulant and the rate of filtration be at all times satisfactory to the State Board of Health.

2nd. That detailed plans showing method of controlling rate of filtration be submitted to and receive the approval of the State Board of Health before the plant is built; and

3rd. That detailed plans of the sedimentation basin and of the coagulant apparatus be submitted to and receive the approval of the State Board of Health before the plant is built.

Detailed plans are now submitted in order to fulfill Conditions Nos. 2 and 3 quoted above. These plans are numbered 2294, 2295-A, 2295-B and 2295-C, D and E. The plans marked 2294, 2295-A, 2295-B were included in the general plans approved in June, 1907. As now submitted, however, more details have been added to these sheets.

The detailed plans include the following:

(1) A rectangular sedimentation basin 10 feet wide, 25 feet long and 24 feet deep, adjoining the filter house.

For present needs this basin will have ample capacity. It is at such elevation that the surface of the water will be but slightly above the surface of the water in the filters. This will enable the water to pass to the filters without breaking up the flock, and is an advantage over the method first proposed in the general plans.

(2) A coagulant plant located above the filters. This plant consists of a double tank for mixing and storing the solution, each compartment being 3 feet by 3 feet by 5 feet deep, with outlet leading to a feed or orifice box which is to regulate the discharge of the solution into the upper end of the sedimentation basin.

(3) Filter controllers of simple design, consisting of wooden boxes and butterfly valves.

At a meeting of the State Board of Health, held April 22, 1908, the revised plans for a water purification plant for Jefferson, as shown on drawings submitted April 11th, 1908, by Mr. L. E. Chapin, consulting engineer, were considered, and these plans were approved, provided:

1st. That the management and operation of the plant, the use of the coagulant, and the rate of filtration, be at all times satisfactory to the State Board of Health; and,

2nd. That the loss of head gages be placed at the outlets of the filters when the plant is constructed.

REPORT ON PRESENT AND PROPOSED NEW WATER SUPPLY FOR LANCASTER.

Application was made for approval of a new water supply for the city of Lancaster. This was referred to the assistant engineer, who made an exhaustive report on this and the proposed new water supply.

The report showed that the water from one of the existing sources is liable to pollution and that the combined yield of the two sources is insufficient to meet the present demands of the city. A new or additional supply is, therefore, necessary.

It is proposed to derive a new supply and to furnish the whole city with water from deep wells located near the old pumping station at the foot of Wheeling Street, and to abandon the present supplies. A test well 90 feet deep had been driven at this location and was found to yield water of satisfactory quality in large quantities.

January 28th, 1908, the State Board of Health approved the use of land adjoining the old pumping station on the north side of Wheeling Street immediately west of the old canal bed, for water supply purposes, provided that all wells located thereon be cased to a depth of at least 70 feet, and that no source of pollution which in the opinion of the State Board of Health would affect the quality of the water be allowed within 500 feet of any well.

REPORT ON PROPOSED WATER SUPPLY FOR MALTA.

In June, 1908, application was received from Mr. Paul R. Murray of New Philadelphia, consulting engineer for Malta, requesting approval of a location for public water supply wells for that village. One of the assistant engineers visited Malta on June 22nd, 1908, for the purpose of making an examination on the ground and collecting samples. As a result of the investigation and analysis of sample, the consulting engineer and village authorities were informally advised that the location selected would not be satisfactory to the State Board of Health.

Accordingly, two new sites were selected and test wells driven, and approval requested of either or both. These sites were investigated by one of the assistant engineers July 15th, 1908. Following this investigation, the village authorities were again informally advised that the new sites would not be satisfactory.

At the time of this second investigation, the assistant engineer inspected the country in the vicinity of Malta with a view to finding a more acceptable location than those submitted for approval. An informal recommendation was made in favor of land lying to the northward of the village. Owing to the expense of developing this site, the village authorities decided to try again nearer the village and chose a fourth site, for which approval was requested.

A visit by one of the assistant engineers was made August 17th, 1908, for the purpose of inspecting the fourth site and collecting a sample from a test well that had been driven thereon. Again, however, the results proved unsatisfactory, to which effect the local authorities were informally advised.

As a last recourse within the means of the village, a site known as the glass works lot was chosen within the corporation limits, but somewhat removed from the present built-up portion. The site was not entirely free from objections, and this was recognized by the local authorities in the light of previous informal advice that had been given them by the Board. However, several test wells were sunk and a request for another investigation was made. To decide the necessity of sending a representative of the Board, the village authorities were first asked to collect a sample from one of the new test wells for analysis. While the analysis was not entirely satisfactory, the possibilities of pollution as indicated by a description of the site seemed remote, and accordingly it was determined to collect additional samples and make an inspection on the ground, for which purpose one of the engineering assistants visited Malta on September 22nd, 1908. During this visit a sample was also taken from still another well which had been in use for a considerable length of time, but it soon after developed that even though the analysis did prove satisfactory, suitably located land for developing a supply was not obtainable. The village authorities feeling that they had done all within their means to find a site satisfactory to the State Board of Health, requested approval of the glass works lot for the location of public water supply wells. A general description of this locality as well as a brief outline of the previous investigations was presented in the following report:

The village of Malta lies in the central part of Morgan County on the west bank of the Muskingum River and directly opposite the village of McConnelsville. At this point the valley of the Muskingum River is comparatively narrow, and the village occupies a position partly in the bottom lands bordering the stream and partly on the steep hills forming the side of the valley. As a result of this peculiar location, the village extends out along the valley and is rather narrow in the direction transversely of the valley. The population is estimated locally to be in the vicinity of 1,000, and this agrees fairly well with the United States census reports. The village presents a generally neat and clean appearance, though as yet comparatively few public improvements have been made.

Malta is to some extent an agricultural center, but derives its principal importance from its manufacturing industries. Among these may be mentioned a plow company, several woodworking establishments, a tannery, and a factory for the manufacture of trousers, overalls, shirts, etc.

While an inspection of the village would not indicate the sanitary conditions to be altogether satisfactory, it is understood that Malta has been generally free from diseases of a contagious or infectious nature. Private wells which are at present in general use are ordinarily driven to depths of 30 or 40 feet in the river drift deposits which occur in the lower parts of the valley. There are but few dug wells and these are generally in outlying districts. Outdoor privies of poor construction are in general use and these are often dangerously near to wells.

The village has no system of sewerage, though there are a number of drains which have been laid from time to time either by the village or by private parties. Practically all of the streets leading toward the river contain one of these drains, which receive besides surface wash more or less sink drainage and cesspool overflow. It is understood that the village is desirous of having an adequate system of sanitary sewers on account of the expected introduction of a public water supply and the consequent more extensive use of modern plumbing.

The desire for a public water supply was mainly prompted by the wish to have a more complete fire protection than is at present available, but the general progressive spirit of the village, as well as a feeling that the private wells do not in all cases yield a good quality of water from a sanitary point of view, were also factors in leading the people to vote public water supply bonds. The bond issue was based upon an estimate made for securing a water supply from the neighboring town of McConnelsville, but on further consideration it was deemed advisable for various reasons for the village to have a supply of its own. It therefore happened that the village had progressed rather far in the project before the source of supply was determined upon, and owing to the impossibility of securing additional funds, it became necessary to select a source of supply near enough to the village to permit of its development within the limits of the funds available.

It was generally known through experience with private wells that the river drift deposits bordering the river bank were productive of large quantities of ground water. Accordingly, attention was immediately turned to the water front of the village for a suitable site for the location of public supply wells. The difficulty in this connection was to secure a site sufficiently removed from habitations to preclude the possibility of pollution therefrom reaching the wells. It was not deemed feasible to go outside of the corporation limits either in a northerly or southerly direction, owing to the additional cost necessary to pipe the water from such a site into the village. The first location selected for drilling a test well was believed to be sufficiently removed from habitations to insure the good quality of the water, but analysis of a sample collected indicated the presence of contaminating influences, and while the water at the time was not dangerous from a sanitary point of view, it was believed that continued heavy pumping, such as obtains in the case of a public supply well, would in time permit the contaminating influences from dwellings and accompanying privies to approach the wells and in time render the supply unsafe. On the informal advice of the State Board of Health, the site was abandoned, and additional sites were in turn investigated. (For analyses see Laboratory Report.)

The most promising site for the location of wells, and that for which approval is requested, is what is known as the "glass works lot." This land lies near the river bank in the northern part of the village, as shown on map submitted by the consulting engineer. The glass works property occupies a lot 325 feet long and 250 feet wide, or about 1.9 acres, and it is understood that the village, while not intending to purchase the property outright, can obtain sufficient control to prevent the location thereon of any additional buildings or the occupation of the present buildings by industries which may endanger the quality of the public water supply. The surface drainage is in general eastward toward the river. Through the middle of the lot and about 75 feet west of the test wells (Nos. 5 and 6) is a drainage ditch, which at times receives washings from a barnyard and several pigpens belonging to a farm house about 300 feet to the north of the test wells. The glass works occupied an old building something over 100 feet to the westward of the test wells, but this building has not been in use for four or five years and is not likely to be used again as a glass works. It is probable, however, that it will be rented for storage of grain, which purpose would not necessitate its being occupied by persons except occasionally, and provision could readily be made for prevention of contamination of the ground in the vicinity of the building. The farm house to the northward and 300 feet distant is not believed to be a direct menace to the quality of the water from the proposed wells, since the subsurface drainage is not in line with the wells. The only possible way that the drainage from the farm house could injure the wells would be indirectly through the medium of the drainage ditch before mentioned. This ditch, on the other hand, can readily be filled in at small expense and the drainage diverted directly from the farm house to the river.

The test wells located on this property, as will be observed from an examination of the analysis sheet, present a water of generally satisfactory quality, though there are present small quantities of nitrites and nitrates. The chlorine is also somewhat high, but it is not possible to state whether or not it is above the normal for uncontaminated waters derived from the river drift deposits in this vicinity. The bacterial counts in the second sample from well No. 5 and the sample from well No. 6 are rather high, but this must be attributable to atmospheric conditions at time of collection. The wells are very near a road, upon which at time of sampling wagons and automobiles were continually passing, so that it would have been impracticable to wait for the dust raised by these vehicles to settle before taking the sample; and in view of these great quantities of dust that were stirred up, it is not surprising that the bacterial analyses were affected. Viewing the mineral content, it may be observed that a very favorable quality of the waters from these two wells is their marked softness as compared with the waters from the other test wells sampled; the incrusting constituents especially are low. There is present a small amount of iron which might be perceptible to the taste, but it is not sufficient to cause turbidity or sediment, and is much less than was found in some of the other test wells.

At a meeting held October 20, 1908, the State Board of Health approved plans for a proposed water supply for the village of Newton Falls, to be obtained from wells located on what is known as the "glass works lot," as shown on map submitted by Mr. Paul R. Murray, of New Philadelphia, consulting engineer, provided:

1st. That an ordinance be passed by the village council prohibiting the location of any additional buildings within 500 feet of any well.

2d. That all surface drainage now reaching the property be diverted in a manner satisfactory to the State Board of Health.

3d. That the drainage from existing buildings within 500 feet of the glass works lot be regulated in a manner satisfactory to the State Board of Health.

4th. That complete plans showing method of developing the public supply, including plans of the pumping station and accessories, be submitted to and receive the approval of the State Board of Health before the water is supplied to consumers.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR MANSFIELD.

On October 29, 1908, a communication was received from the board of public service of Mansfield, requesting an investigation by a representative of the State Board of Health of a proposed additional source of water supply. In accordance with this request, one of the assistant engineers visited Mansfield on November 6, 1908, in company with the city's consulting engineer, Mr. E. G. Bradbury, of Bradbury & Shute, of Columbus. At the request of the assistant engineer, the city engineer, Mr. Ora Hursh, collected samples of the proposed additional supply, as well as of existing sources of supply, several days following the investigation. The analyses of these samples did not prove entirely conclusive, and therefore an additional set of samples was collected by one of the engineering assistants November 25, 1908. The following report was submitted:

At the present time the public water supply of Mansfield is derived from three groups of wells. The first of these is near the main pumping station in the northeastern part of the city, but this group has been temporarily abandoned owing to the expense and difficulty of raising the water by means of air lift.

The second group is to the north-northwestward of the first group, and consists of three wells, only two of which are at present in use. The wells in this group are pumped by centrifugal pumps, which discharge the water under a low head into a conduit leading to a reservoir near the main pumping station.

A third group, consisting of two 10-inch wells, is near the central portion of the city, and in the ravine of Tuby's Run, just north of Bloom Street. The water level of these wells is sufficiently near the surface of the ground to cause the water to flow by gravity to the receiving basin at the site of the main pumping station.

The difficulty and expense of procuring a sufficient quantity of water from the existing sources of supply are so great as to render it advisable to seek an additional source. The additional source of supply now proposed is what is known as Hedges or Paper Mill Spring, in the southeastern portion of the city, near the edge of the bottom land in the valley of Wolf Creek. This spring has yielded a large flow for a great many years, and the water has always been considered of unusually good quality. It is believed that a sufficient quantity of water can be furnished by the spring, if properly developed, to meet all the demands of the additional public supply for some years to come. Nevertheless, suitable tests for yield should be made before any money is spent for permanent construction. The spring appears on land lying at the foot of the hills which form the south side of Wolf Creek valley. The water is seen emerging from the gravel deposits, and apparently under considerable pressure. Some years ago a deep tubular well was sunk near the spring for supplying water to the paper mill formerly located upon this site. A large supply of water was encountered, which appeared in the well under sufficient pressure to cause it to rise six or eight feet above the surface of the ground. The well was subsequently capped, and a small pipe line run to a near-by watering trough, where the water still flows with undiminished force.

No reliable data could be obtained relative to the geological formation from which the waters in the spring and well are derived. From the fragmentary data that were obtainable, it would seem that the valley of Wolf Creek was eroded to a great depth during the glacial period when the general surface of the land was believed to have been at a much higher elevation than at present. Subsequent to the glacial period there was a general subsidence of the surface of the country, during which time the deeply eroded stream beds were filled to a great depth with debris. This debris is partly of glacial and partly of water borne origin. Now in the case of the Wolf Creek valley at the site of Hedges Spring it is believed that there are one or more waterbearing rock strata at a considerable depth, which strata outcrop in the ancient valley now filled with drift. The water in these rock strata is under sufficient pressure so that when it emerges in the drift, it immediately rises toward the surface of the ground and is seen issuing as a large spring near the foot of the hills forming the old valley of the creek. This theory is further borne out by the fact that the well above referred to encountered at a great depth a large quantity of water which rises within the well considerably above the level of the water in the spring, due to the fact that it is permitted to reach the surface without undergoing the friction losses suffered by the spring water in passing upward through the drift.

The location of the spring is not all that is desirable for a source of public water supply. If the theory regarding the waterbearing rock strata be correct, it is apparent from a glance at a topographical map of the vicinity that this water must pass under a large part of the built up portion of the city. On the other hand, there are no dwellings or other buildings in the directions from which the water can possibly come, under the theory advanced, within 700 feet of the spring. Furthermore, the fact that the water is under considerable artesian pressure would preclude a possibility of pollution from these nearby sources of possible contamination. In the opposite direction, namely, toward Wolf Creek, from which direction it is not probable that the water in the spring is derived, there are within 300 feet several habitations, a railroad roundhouse, and other buildings.

From what has been said above, it would seem apparent that the approval or disapproval of Hedges Spring as a source of supply must depend largely upon analytical evidences. To this end, on November 9th, 1908, samples were taken of the spring and nearby flowing well, and for comparison samples were also taken of the present supply. From the analyses it appeared that the bacterial sample of the spring, at least, was not taken with sufficiently great precaution, and it was further desirable before reaching any definite conclusions to have confirmatory evidence of the quality of the water through an additional set of samples, which were accordingly collected from the spring and well November 25th, 1908. Disregarding the first bacterial determination on water from the spring, it would appear that both the spring water and well water are of good quality from a sanitary point of view. The water from the spring contains some nitrates, but no nitrites or ammonias, which would indicate that if any pollution does take place, purification is complete by the time the water reaches the spring. It is further evident that the contamination, if it exists, cannot have been great in amount as evidenced by the comparatively low chlorine.

There are certain differences between the spring water and the well water which would make it appear that the two waters are not entirely from the same source. These differences are noticeable, particularly in the absence of nitrites and nitrates in the well water and the presence of both these constituents in the spring water, in the chlorine content of the two waters, and in the appreciable quantities of incrustants in the spring water, whereas the well water contains none. Otherwise, the mineral constituents of the two waters are strikingly alike. Both are fairly hard waters, though not especially hard for Ohio ground waters. The most likely explanation of the difference that exists between the two waters is that the spring water is composed of water similar to that derived from the well, more or less admixed with water having an origin nearer the surface.

If the above explanation of the variations in the character of the spring water and the well water be correct, this circumstance should have some bearing upon the method of developing the proposed supply. While it is not probable that the land in the vicinity of the spring and in any direction from which the water is likely to come, will be built up within the near future, yet reasonable caution would require that the water coming from strata near the surface of the ground should be excluded. It would, therefore, seem that the logical way to develop this source of supply would be by means of tubular wells solidly cased to at least a depth of 50 feet, beyond which point may be placed suitable well strainers of any desired length. In order to further safeguard the quality of the supply, it would be advisable that the city control a sufficient area of land to prevent the erection of habitations or other sources of contamination within 500 feet of any well in the directions from which the water is likely to come, and within 300 feet of any well in any other direction.

At a meeting of the State Board of Health, held December 10th, 1908, plans for a proposed additional water supply for the city of Mansfield to be obtained from what is known as Hedges or Paper Mill Spring, located in the southeastern portion of the city near the edge of the bottom land in the valley of Wolf Creek, were approved, provided:

1. That this additional source of public supply be immediately abandoned whenever investigation by the State Board of Health indicates the necessity of so doing.

2. That complete plans showing the development of this additional supply be submitted to and receive the approval of the State Board of Health.

REPORT ON PROPOSED NEW WATER SUPPLY FOR MARTINS FERRY.

On June 15th, 1908, plan for proposed new water supply for Martins Ferry was submitted by Mr. E. D. Lash, secretary of the department of public service. In anticipation of receiving plan, the chief engineer visited Martins Ferry on June 4th, 1908, to make an inspection of conditions. The following report was submitted:

Martins Ferry is in Belmont County and has a population of about 10,000. The city at present derives its water supply direct from the Ohio River. Practically all of the population use the public supply. The average daily consumption for 1907 was reported to be 2,750,000 gallons.

In order to secure a better supply, the local officials have adopted a plan for obtaining water from a line of driven wells in the sand and gravel deposits bordering the Ohio River. These wells are each to be 12 inches in diameter and 15 to 20 feet deep, with strainers on the lower end. It is planned to install twenty at first. These will begin at the pumping station and extend up-stream for a distance of some 750 feet. They will all be connected to a common 20-inch suction main from which the water will be drawn.

One of the wells has already been driven and a sample was collected by the superintendent of water works after a short pumping test and sent to the laboratory of the State Board of Health for analysis, together with a sample of the river water taken at the same time. With twenty wells separated as proposed, there is little doubt that a sufficient quantity of water can be secured.

On August 24th, 1906, the chief engineer of the Board collected a sample from a driven well located near the pumping station, which probably draws from the same source to a greater or less extent. (For analyses see Laboratory Report.)

July 24th, 1908, the Board voted to approve the proposed new water supply for Martins Ferry, to be derived from driven wells along the edge of the Ohio River, as shown on blue print submitted by Mr. E. D. Lash, secretary of the board of public service, on June 15th, 1908.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR MASSILLON.

On July 20th, 1908, there was received from Mr. A. W. Inman, superintendent of the Massillon Water Supply Company, a communication requesting the approval of three deep wells to be used as an additional source of public water supply. Sample bottles were sent to Mr. Inman for the collection of samples, and were filled and returned to the laboratory July 27th, 1908. One of the assistant engineers visited Massillon on August 21st, 1908, for the purpose of making the necessary examination on the ground. The following report was submitted:

There has already been submitted to the State Board of Health, under date of May 8th, 1907, in connection with the general examination of water supplies throughout the state, a complete report on the public water supply of Massillon, to which reference is made for description of water works equipment and detailed information relative to general characteristics of the city in as far as these have a bearing upon the public water supply. It will, however, be advisable to again review in brief the history of the public water supply, including previous investigations and actions of the State Board of Health.

The original supply was installed by a private company in 1881 and was conveyed by gravity from Sippo Lake in the northeastern part of the city through a system of wooden mains and distributing pipes. In 1886 the water works were taken over by the present company, namely, The Massillon Water Supply Company, and a new franchise was granted by the city. This franchise embodied among others the following provisions:

> "The water is to be taken from Sippo Lake, which is to be thoroughly cleaned and such precautions taken as will prevent future contamination, and be conducted from the lake to an impounding reservoir similarly prepared and protected. From the reservoir the water shall be first filtered and be led through a 24-inch main to the pumping station of the company, from which it will be pumped into a standpipe or reservoir of sufficient capacity and elevation to at all times supply all parts of the city with water."

An impounding reservoir was made by constructing a dam across Sippo Creek. A pumping station was built near the dam and a new distribution system of cast iron pipes was installed. Owing to the fact that this supply was generally turbid and frequently polluted, it proved to be unsatisfactory.

In 1891 the reservoir water was abandoned for domestic purposes and a deep well supply was sought in the valley of the Tuscarawas River to the northwestward of the city. At this time six deep wells were drilled, of which five are now in use. Following the successful discovery of ground water, the franchise granted to the water company was changed to read that the water should be derived from artesian wells.

As a fire emergency provision, the old pumping station near the reservoir is still maintained in good condition with one of the original pumps in place. There has, however, been no occasion for its use, since the well supply has so far been able to meet all contingencies.

The old gravity system of wooden mains is still being used for delivering water from the reservoir to certain manufacturing concerns for industrial purposes only.

Recently, owing to the growth of the city and perhaps also to a tendency to use the water in greater quantities, the deep wells have given indications of not being able to yield enough water for the entire consumption of the city. To meet the increased demand, three new wells were drilled during 1906, but were not then connected with the suction line leading to the pumping station. During June and July of the present year, it was decided to make use of the water from these new wells, and accordingly, request was made of the State Board of Health for their approval. Following the examination by a representative of the engineering department and the report of the chemist on analyses of samples of water from these three wells, a letter was sent to the water company by the secretary of the Board, under date of September 10th, 1908, informally advising that as the analyses indicated the water to be of satisfactory quality, the water company would be justified in case of serious shortage in making temporary use of the additional supply pending the action of the Board.

Detailed Description of Wells.—As already noted, the wells are located in the northwestern part of the corporation in the valley of the Tuscarawas River. The company owns a rectangular plot of land about 500 feet long by 400 feet wide, on which is located the pumping station and four of the deep wells. The other wells are all on land upon which the water company has acquired water rights, but such land is also being used by its owners for various other purposes. For convenience in consideration the old wells are numbered 1, 2, 3, 4, 5, 6, and 7, and the new wells 8, 9, and 10. Well No. 7 as far as could be learned has never been connected, and well No. 3 has recently been abandoned. Three of the wells in use, namely, Nos. 2, 4 and 5, are quite close to residences. The locality in general is fairly well built up. A nearby rolling mill has a drain which discharges into Newman Creek and passes very near to well No. 5.

The wells in general are about 200 feet in depth. The formation pierced seems to consist of sand, gravel and clay, until bed rock is reached at a depth of about 80 feet. The bed rock is sandstone, probably the Sharon conglomerate, and extends to depths of from 180 to 200 feet below the general surface level. Below the sandstone is found shale. The lower depths of the sandstone form the waterbearing stratum from which the supply of the deep wells is derived. All of the wells are provided with 6-inch casings hermetically sealed at the top and extending for a number of feet into the rock. The water which, as already noted, is derived from the lower layers of the rock, rises under some artesian pressure, but not at present sufficient to cause it to flow from the mouth of the well. The depth at which the water stands in the various wells below the surface, when not being pumped, is about 3 to 10 feet. It is said that when the wells were first drilled, the pressure was sufficient to cause them to flow from the well mouth under a slight head. During ordinary pumping the water level in the wells is lowered about 15 feet, and it is found that wells near together more or less affect each other.

The new wells, Nos. 8, 9 and 10, are better located than the old wells so far as surface indications are concerned, though No. 8 is nearer a dwelling than under most conditions would be considered desirable. Analyses, however, fail to reveal any positive evidence of surface contamination, though there are a few indications (to be touched upon later) in several of the samples, which may have some significance in this direction.

Analyses representing the deep well supply have been made by the State Board of Health on samples received on the following dates: May 12, 1899, March 21, 1907, April 17, 1907, and July 27, 1908. All of the analyses show waters having the same general characteristics, though there are slight variations in some of the constituents. These variations do not in any way indicate a deterioration; if anything, the evidence points in the other direction since, as may be noticed, the recent samples contain less than half the amount of chlorine of the earlier samples. The explanation of this is not made plain by any of the local conditions.

On the last date above mentioned, samples were collected separately from wells Nos. 8, 9 and 10. These samples showed waters almost identical in character. It may be pointed out, however, that well No. 8, namely, that nearest sources of possible surface contamination, shows the presence of a small amount of nitrites and a somewhat higher chlorine content than the other two wells. All of the waters, notwithstanding, must be pronounced of good quality from a sanitary point of view at the time the samples were collected. Wells Nos. 8 and 10 show a larger iron content than any of the analyses hitherto made, and the iron is furthermore present in sufficient quantity in these two wells to cause objectionable staining of plumbing fixtures and fabrics in the laundry, and may give rise to complaint on the part of consumers.

At its meeting on October 20th, 1908, the State Board of Health approved plans for a proposed additional water supply for the city of Massillon, to be obtained from three deep wells located in the valley of Newman Creek, northwest of the city, as shown on sketch on file with the Board, provided that samples of water from the proposed wells be submitted to the State Board of Health for analysis at regular intervals of six months.

REPORT ON PROPOSED WATER SUPPLY FOR NEWTON FALLS.

On January 22, 1908, Mr. D. M. Hine, solicitor of Newton Falls, appeared before the Board on behalf of the village and asked its approval of a scheme to secure a public water supply from the west branch of the Mahoning River. The matter was referred to the chief engineer, who visited Newton Falls on February 7, 1908, met the mayor and other officials, and investigated the proposition. The following report was made:

The village of Newton Falls, having a population of about 1,000, is situated in the western part of Trumbull County. At present there is no public water supply. The domestic supply is being derived from wells sunk in the gravel. There is but one sewer in the village, that in Main Street, which has been built for many years and which receives surface water and sink drainage.

The west branch of the Mahoning River, having a watershed of some fifty square miles, rises in Portage County about fifteen miles west of Newton Falls. The stream passes within a mile or so of the center of the village of Ravenna, and although it does not receive the sewage from this place it undoubtedly receives more or less surface drainage. Although its watershed in general is comparatively sparsely settled, it would not be safe to use this stream as a public water supply without filtration. It is proposed to locate the water works intake at a point above the 15-foot dam which is built in this stream near the upper part of the village.

February 18, 1908, the Board approved this scheme to secure a public water supply for Newton Falls from the west branch of the Mahoning River at a point above the village, as presented by Mr. Hine at the meeting of the Board held January 22, 1908, provided the water first be purified by a filtration plant of a design to be approved by the State Board of Health.

The authorities were advised that before taking water from the river, the Board would recommend that investigations be made for the purpose of determining whether or not a suitable ground water supply can be obtained.

On June 17, 1908, at the request of Mr. Carl W. Smith, village clerk, one of the assistant engineers visited Newton Falls to make an investigation of a proposed water supply. The following report was submitted:

At present there are no manufacturing industries in Newton Falls, but there are under construction two hydro-electric power plants just below the village, one on each branch of the river. These plants are being built by The Peerless Electric Company of Warren, and that on the east branch of the river is now nearly completed.

There is at present no public water supply nor system of sanitary sewers in Newton Falls, so that the majority of residences are provided with private wells and privy vaults.

PROPOSED WATER SUPPLY.—There are two possible methods for obtaining a satisfactory water supply for Newton Falls, the one by filtration of water from the Mahoning River and the second by obtaining a water from ground sources. The former method requires a greater cost both of installation and operation, so that the first step in obtaining a public water supply has been the investigation of the available ground water.

Previous to the inspection of June 17, 1908, a well from which it was proposed to obtain a public supply had been drilled in a lot located about one-fourth of a mile from the center of the village in a southwesterly direction and bordering on the west branch of the Mahoning River. This lot is at present vacant and is owned by private parties. The test well was located in about the center of the lot, and the nearest source of possible pollution is from a vault about 175 feet distant from the well.

The total depth of the well, which is 8 inches in diameter, is 58 feet. The upper 10 feet of material through which the well is drilled consists of soil and drift; the next 3 feet is shale; the next 19 feet a yellow sandstone rock; while the lower 26 feet is a white sandstone rock. The upper 13.5 feet of well is enclosed in a watertight casing. When there is no pumping from the well, water stands to a depth of about 10 feet below the surface of the ground; but when pumping at the rate of 40 gallons per minute, stated to be the maximum capacity of the well, the water is drawn down to approximately 30 feet below the surface.

Samples for analysis were collected on June 17th, and it was stated that the well had been pumped for twenty hours previous at a rate of approximately 40 gallons per minute. (For analyses see Laboratory Report.) When received at the laboratory, there was a heavy red deposit in the bottom of the sample bottles, due to the precipitation of iron. When collected, the water had a turbidity of approximately 5 parts per million, but when received in the laboratory this had increased to approximately 100 parts per million, due to the separation of iron.

The analyses indicate a clear water and also one that is comparatively soft for a ground water. In general, it may be said that the water is of very satisfactory quality for both domestic and industrial purposes, provided the iron is removed.

As it was thought that the high iron content of the first test well was due to its excessive depth, a second well was subsequently drilled on the same lot to a depth of but 35 feet, 23 feet less than that of the first well. On August 19th, 1908, there was received at the laboratory of the Board a sample from the second test well, collected August 17th. The well had been pumped for approximately thirteen hours previous to collection of the sample and was said to have a capacity not greater than 7,000 gallons per twenty-four hours. (For Analyses see Laboratory Report.) Its most striking features are its high iron content and turbidity.

As the sample was clear when collected, this high turbidity was due to the precipitation of iron. The analysis indicates a water satisfactory for domestic and industrial purposes provided the iron is removed.

At the recommendation of the secretary of the Board, a sample of water obtained from a well said to be 102 feet deep and located about half a mile south of the center of the village, was shipped to the laboratory on September 11th, 1908. This water was more satisfactory than that obtained from the comparatively shallow test wells, was clear, and contained but 0.6 part per million of iron.

As the evidence indicated that a more satisfactory water in regard to iron content could be obtained from comparatively deep wells, a third test well was drilled in a triangular lot owned by the village and located in the southeastern part of Newton Falls on the east branch of the Mahoning River near the L. E. A. & W. Railroad station. This location is more satisfactory than that where the first two wells were driven, as there is but one visible source of pollution, namely, a privy about 400 feet distant. The property adjacent to the lot is generally not built up.

On this lot has been drilled an 8-inch well to a total depth of 103 feet and through 9 feet of drift said to consist largely of fine gravel, 21 feet of sandstone and 74 feet of blue slate. Before pumping was commenced, water stood in the well to about the same height as that in the river, namely, 8 feet below the top of the well.

This well was inspected on October 1st, 1908. Pumping was commenced about thirty minutes previous to inspection, and although the water was considerably turbid, it was clearing up. It was advised that, before sampling, the well should be pumped for at least twenty-four hours after the water had cleared. On the following day, however, a sample was taken and shipped to the laboratory of the Board for analysis.

It is apparent that the well had a strong flow, greater than could be exhausted by the pump provided, which had a maximum capacity of about 85,000 gallons per twenty-four hours. Owing to the shortness of the pump, it was impossible to obtain water from a depth greater than 50 feet. It was stated that the water from the upper strata had been cased off to the surface of the slate before pumping.

The analysis of the sample collected October 2nd, 1908, indicates a water of a quality similar to that of the samples previously collected from the first two test wells. It is of a quality satisfactory in all respects for domestic and industrial purposes, except its iron content (4.5 parts per million). Its turbidity (100 parts per million) is due to the precipitation of iron, which must be removed to produce a water of satisfactory quality.

At its meeting on October 20th, 1908, the State Board of Health approved of plans for a proposed water supply for the village of Newton

Falls, to be obtained from wells located on land owned by the village on the east branch of the Mahoning River near the L. E. A. & W. Railroad station, provided:

1st. That all sources of pollution within 500 feet of the wells be removed, and that the village obtain control of the territory within 500 feet of any well with reference to preventing the establishment of any new source of pollution.

2nd. That the iron be removed from the water in a satisfactory manner before delivering it to consumers.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR ORRVILLE.

In November, 1907, Mr. B. G. Cope, member of the board of trustees of public affairs of Orrville, asked the Board's approval of a proposed additional water supply for that village. The assistant engineer visited Orrville on December 17th, 1907, made an investigation and reported as follows:

The village of Orrville lies in the eastern part of Wayne County and has an area within the corporation limits of approximately 1.9 square miles, about one-third of which is built up. The population as given in the 1900 census was 1,901. Based on previous rate of growth, the population at present would be in the neighborhood of 2,000; the local estimate, however, places the figure at 3,000. The population is increasing rapidly and there is likely to be a still greater increase in the near future, owing to the fact that the Cleveland, Akron and Columbus Railroad has made Orrville a terminal point and is about to build roundhouses and repair shops. This move on the part of the railroad will undoubtedly induce a great many trainmen and mechanics to make their homes in Orrville.

The neighboring topography varies from slightly undulating to gently hilly. Orrville is situated at the joining point of two ancient valleys of erosion, formed during some previous geological period. One of these valleys comes from the southward, the other from the eastward, and the general trend of the main valley formed at their union is toward the northwest. All of the valleys are at the present time filled to a great depth with drift deposits consisting of clay, sand and gravel. Much of the gravel found in these valleys is water-bearing, and occasionally the water is under sufficient pressure to force it above the surface when tapped. The rocks immediately underlying the drift deposits in the vicinity of Orrville belong to the Waverly group and appear as soft shales and Logan sandstone, the latter being the conglomeritic phase of the Waverly group. This rock is generally water-bearing and many wells of large yield, including the present public supply wells, derive their water from this rock. A local well-driller was questioned as to the depth at which bed rock is generallly encountered, and the following information was obtained:

At the southern part of the village the rock is a light-colored sandstone and is encountered at a depth of from 6 to 15 feet. In the central part the first rock encountered is a somewhat soft blue shale found at a depth of from 12 to 14 feet. The sand rock is not encountered until a depth of from 75 to 80 feet is reached. In the northern part of the village the shale is encountered at 35 feet and the sand rock at 50 to 70 feet. In the ancient valleys of erosion, before mentioned, the rock is not found until a depth of from 150 to 200 feet is reached.

The above figures are based on a limited number of borings and a greater number would probably reveal somewhat different conditions.

Orrville contains about half a dozen small to medium sized manufacturing and industrial establishments, which include a drill works, foundry, bed spring and bedding factories, and several woodwork mills. As above noted, Orrville has recently been made a terminal of the C., A. & C. Railroad, and this will give it added industrial importance. The village is also quite a farming center, and great quantities of potatoes and onions are raised in the fertile drift deposits of the ancient stream valleys.

But very few private wells remain in use in the village of Orrville, since nearly the entire population depends on the public water supply. Such as do exist are generally carried to rock, and great caution is observed by the health authorities not to permit wells to be located nearer to privies than 50 to 80 feet. According to the health officer, the private wells have never been suspected of causing disease.

The village has as yet no system of sewerage, but the contract has recently been let for the construction of such a system together with a sewage purification plant, all to be built in conformance with the approval of the State Board of Health granted in September, 1907.

It was stated by the health officer that the sanitary conditions of Orrville are generally good, and that there is comparatively little typhoid fever. The largest number of cases that have ever been known in a single year occurred in 1906, when fifty were reported. The cause of these cases was not definitely ascertained. During 1907 there were but six cases of typhoid. It will be remembered that during 1906 typhoid fever was unusually prevalent throughout the country.

PRESENT SUPPLY.

The present public water supply was installed in 1894 at a cost of approximately $25,000, and is drawn from four wells located in the northern part of the village. The land owned by the village and on which the pumping station and wells are located is about two acres in area. Six or seven buildings border this property, several of which maintain privies within 200 feet of some of the wells. The wells vary in depth from 114 to 121 feet. They are 8 inches in diameter near the top, but as greater depths are reached the diameter is reduced to 6 inches. The formation penetrated was 35 feet of drift and the remainder of the way Logan sandstone. The wells yielded water as soon as the sandstone was encountered, and the quantity of water increased with the descent of the drill. All of the wells are probably deeper than necessary to produce the full quantity of water available. The largest quantity of water delivered by any one of the wells, as obtained during a test conducted shortly after they were sunk, was 125,000 to 140,000 gallons per day for a period of six weeks. At the present time the limit of the capacity of the wells, when the water therein is lowered to a depth of about 26 feet below the surface of the ground, is in the neighborhood of 300,000 gallons. This quantity is scarcely sufficient for the needs of the town and the demands of the railroad, which also uses the public supply. Several years ago an attempt was made to increase the supply by the introduction of air lift machinery. No authoritative records of this test were available, but it is understood that the increased yield was but slight and that the cost of operating the air lift equipment was uneconomical.

QUALITY OF WATER.—The analysis of the sample of the present supply, collected on December 17, 1907, indicates this water to be of good quality from a sanitary point of view, but a slight indication of contaminating influence is given in the rather high free ammonia, trace of nitrites, and the rather high chlorine. If this supply is to remain in use in conjunction with the proposed additional supply, the authorities should take steps immediately to have all privies in the vicinity removed or reconstructed in such manner that pollution of the soil will be impossible.

PROPOSED ADDITIONAL SUPPLY.

For the reasons given above, the village authorities have been seeking an additional supply. This work has been carried on for a period of somewhat over a year. At first it was proposed to utilize several springs lying to the northwestward and southeastward of the village, but measurements indicated the yield to be too small. These springs, it was noted, emanated from low points in the ancient stream valleys, and this fact suggested the idea of obtaining water from wells located in these valleys. Accordingly, twelve test wells have been drilled in the valley which skirts the western part of the corporation. From the available data, it would appear that the ground water in this vicinity is encountered in veins of gravel, and that the flow is toward the northwest.

QUALITY OF WATER.—On the day Orrville was visited the pumps were not being operated, and it was, therefore, impossible to obtain a sample from the proposed wells. The sample collected on November 7th, 1907, by the local officials, however, indicated the water to be of very good quality from a sanitary point of view. The chemical determinations were all favorable, though the number of bacteria was somewhat higher than desirable, but this large number can undoubtedly be duly accounted for by the newness of the wells. The colon bacillus was not present in so large a portion as fifty cubic centimeters. (See Laboratory Report for analysis.)

METHOD OF DEVELOPING NEW SUPPLY.—It is intended to develop the proposed additional supply by locating an auxiliary pumping station in the vicinity of the wells. The wells are to be pumped directly by means of an air displacement pump which will discharge into a vitrified pipe conduit, which in turn will convey the water by gravity to a receiving well at the site of the present pumping station. The existing pumps will be given an additional suction to this receiving well, and the water will be pumped together with the old supply into the distribution system.

CONCLUSIONS.

(1) The old supply is at present of good quality from a sanitary point of view, though the recent analysis reveals some slight contaminating influence. This contamination in all probability comes from nearby privies, and the same should, therefore, be removed or reconstructed in such manner that the soil will not become polluted.

(2) The quality of water from the proposed new wells is highly satisfactory from a sanitary point of view, but these wells should be more thoroughly tested for quantity before any great outlay is made toward their development. When suitable wells have been selected, the village should obtain control of sufficient land to prevent the construction of any residences or buildings within 500 feet of any of the wells.

If a vitrified conduit is to be used to convey water from the new wells to the present pumping station, it should be made of extra heavy vitrified pipe carefully cemented and should be thoroughly tested for leakage. A cast iron pipe with leaded joints would probably be safer construction for this purpose.

On March 2, 1908, the Board approved the tract of land comprised in the William Orr, Mead, Bevington and Saurer farms, for obtaining an additional water supply for Orrville, provided the village secure such control of this and adjoining land that no possible source of pollution will be permitted within 500 feet of any well.

The Board advised that similar precautions be taken for protecting the existing supply, although this supply was at that time safe; that all privies within the vicinity of the present wells be reconstructed in such a manner that the soil could not become polluted; and that more complete tests of the wells for quality of water available be made before developing them further.

The authorities were also advised that complete plans showing the location of each well, boundaries of land controlled by the village, pumping station, and pipe lines, should be submitted to the State Board of Health before construction of the works was begun.

REPORT ON EXISTING AND PROPOSED NEW WATER SUPPLY FOR PLYMOUTH.

In correspondence under dates of August 3rd and 8th, 1908, Mr. M. J. Bell, clerk of the board of trustees of public affairs of Plymouth, requested approval by the State Board of Health of a proposed new source of public water supply. One of the assistant engineers visited Plymouth on August 25th, 1908, to make an investigation of the conditions involved. The following report was submitted:

EXISTING SUPPLY.

Investigation and Action of the State Board of Health.—Plans for a proposed water supply for Plymouth were first submitted to the State Board of Health for approval in the latter part of 1901 by Mr. J. B. Wedell, consulting engineer. These plans called for the use of the west branch of the Huron as a source of public supply. The Board voted to approve this supply upon the following conditions:

1st. That the water be filtered in a manner satisfactory to the State Board of Health; and

2nd. That plans showing proposed method of filtration be submitted to and receive the approval of the State Board of Health.

The local authorities it is said deliberately disregarded the action of the State Board of Health, and proceeded with the construction of the water works without providing for filtration. While the west branch of the Huron River was mentioned in the request for approval, the supply actually developed was from the small tributary to the east branch.

The quantity of water which could be derived from this tributary not being deemed sufficient for all the requirements of the village, there were subsequently drilled five tubular wells near the site of the pumping station in the southeastern part of the village and near the small stream. On April 16th, 1902, a sample of water from one of these drilled wells was sent to the laboratory of the State Board of Health and analyzed at the request of the superintendent of water works. This sample was to have been supplemented by a definite plan for the development of the well supply previous to any action being taken by the Board. Such plan, however, was not submitted and the well supply was used without further reference to the Board.

The combined yield of the tubular wells and the small stream still not being sufficient, the local authorities drilled a large shallow well in the same locality as the tubular wells and requested approval of same by the State Board of Health. An inspection of the conditions at Plymouth was made by the chief engineer on April 24th, 1906, and a report submitted. As a result of this report, the Board in May, 1906, approved the use of the water from the large dug well and also from the five tubular wells, provided the following conditions be observed:

1st. That the sewer which now discharges at the top of the bank a few hundred feet northeast of the location, be diverted and made to connect with the main sewer of the village.

2nd. That the drainage originating in the vicinity of the railroad water tank be conveyed through a properly constructed sewer and disposed of in connection with the remaining sewage of the village.

3rd. That no source of pollution which, in the opinion of the State Board of Health, would affect the quality of the water, be permitted within 500 feet of any well used as a source of public water supply; and,

4th That all direct connection with the creek, by means of which unpurified creek water can enter the distribution system, be cut off.

None of the above conditions have been complied with, as will be developed further under the following heading.

SOURCES OF SUPPLY.—As may be gathered from the foregoing, the sources of supply at present in use consist of the direct intake into the small tributary of the west branch of the Huron River, five deep tubular wells, and one large shallow dug well. The village owns for water works purposes about one and one-half acres of land in the southeastern part of the village, lying just north of the Northern Ohio Railroad and on the west bank of the small run. On this land is located the pumping station, the direct intake, and all of the wells.

The direct intake draws its water from the creek just above a low dam perhaps several feet in height, which serves to maintain the intake pipe submerged. The watershed above the intake is perhaps three square miles in area and supports a rather dense rural population. According to information obtained during the previous investigation by the State Board of Health, there are on the watershed two cemeteries and perhaps 25 houses with accompanying privies and vaults. The stream is entirely unprotected and may receive pollution in various ways. Among these is the washing of cattle cars on the tracks of the Northern Ohio Railroad nearby. The filthy water from this operation is permitted to flow off in an open ditch which discharges into the stream a short distance above the intake. It is claimed that the practice of washing cattle cars has been abandoned, but that the cattle are given drinking water at this point, which may be nearly as bad. Also persons have been found bathing in the pool formed by the water works dam and directly in front of the intake. An analysis of the creek water made by the State Board of Health in June, 1905, indicates sewage contamination and is added evidence that the supply is unfit for domestic purposes. (See Laboratory Report for analyses.)

The deep tubular wells range from 80 to 105 feet in depth. The material penetrated is about 9 feet of clay, about 50 feet of Berea sandstone, and the remainder of the way in Huron shale. The water is derived from several horizons in the Berea sandstone; presumably none is found in the shale. Two of the wells yield but a very small amount of water, and the total yield that may be derived from the five wells is said not to exceed 7,000 or 8,000 gallons per twenty-four hours during ordinarily dry weather. The water in these wells seems to be under sufficient pressure to raise it slightly above the level of the water in the creek. All of the wells are provided with 6-inch casings which extend into the rock. As already noted, but one analysis has been made of water from these wells. This analysis indicated that at the time of sampling the water was suitable for public supply purposes.

The large well is 15 feet in diameter and about 11 feet deep. It penetrates the drift and its bottom rests upon bed rock. The side walls are made of stone masonry loosely laid, and the bottom is left open. For protection against accidental or malicious pollution, the top of the well is covered with a conical wooden roof. This well derives its supply primarily from the lower layers of the drift, which consist of gravel and sand. Some water presumably enters from the underlying rock. The total yield of this well is said to be about the same as that of the five tubular wells. These figures, however, are very rough and are merely based on general observations of the pumping station engineer. Owing to the nearness to the surface of the water-bearing strata from which the large well derives its supply, it may be subject to contamination from several sources of local pollution. The first of these is from the washing of cattle cars or watering of the cattle therein, already described. The open ditch into which the filthy water runs is not over 100 feet from the large well and is considerably nearer to some of the tubular wells. The private drain referred to when describing sewers in Plymouth, was found during a previous investigation. A small flow of sewage was being discharged through a small open ditch onto the bank above the large well and not 75 feet distant. At the time of the recent investigation, this drain could not be found, but no one in the vicinity knew of its removal and it presumably at present discharges into a blind drain and the whole of its flow, which is probably small, is absorbed without reaching the surface. One analysis of a sample collected in March, 1906, from the dug well was made by the State Board of Health, with results that indicated the water to be of satisfactory quality for a public supply, though there were present evidences of some organic contamination. It is quite likely that the heavy pumping from the well since the above date has enlarged the zone from which pollution may be derived.

It will be observed from the foregoing that during the summer months the well supply can yield but from 14,000 to 16,000 gallons per twenty-four hours. The total consumption during such season is about 65,000 gallons per twenty-four hours; thus the deficiency of 49,000 to 51,000 gallons must be made up by creek water drawn through the direct intake. In winter and during rainy seasons, the yield of the wells is much larger and the consumption of the village is considerably smaller, reaching the low figure at times of 20,000 gallons per twenty-four hours. At such times the entire supply is furnished from the wells and may be of satisfactory quality.

PROPOSED NEW SUPPLY.

The village authorities desire to obtain a new or additional supply of good quality in order that there will be no occasion for using the creek water at any time. The most available source for such a supply seems to be an abandoned quarry on the eastern edge of the corporation and just south of the county line. This quarry, including about thirteen or fourteen acres of land, has recently been bought by a local fishing club which intends to stock the quarry with fish and build a club house on its banks. The club is willing to permit the quarry to be used for public water supply purposes for a reasonable consideration. The quarry itself is several acres in area and lies in the valley of the west branch of the Huron River, which is separated from the quarry by a low embankment on its western edge. The excavation for the quarry is made partly in the slope of the hill forming the side of the valley and partly in a narrow strip of level bottom land bordering the stream. The maximum depth of the excavation below the level of the stream is about 60 feet. The sides are generally precipitous and there is but a very small area of shallow flowage. The quantity of water yielded would seem to be ample for all needs of the village for some years to come. The fact should not be lost sight of, however, that with the village drawing a daily supply averaging say 75,000 gallons, the level of the water in the quarry will be lowered and lowered much more in summer than in winter. The amount of this lowering cannot be predicted. but at times may be sufficient to be objectionable from the point of view of the fishing club, and it would therefore be advisable before attempting the development of the supply to conduct a suitable pumping test during the present dry season.

The surroundings of the quarry are such that at the present time at least there is but slight danger from surface contamination. In the development of the supply, however, certain precautions should be observed for preventing future contamination.

At a meeting of the State Board of Health, held September 23rd, 1908, the plans for a new water supply for the village of Plymouth were approved upon the following conditions:

1. All surface drainage from the vicinity of buildings or roadways shall be effectually diverted from the quarry.

2. No cesspool or vault shall be permitted nearer than 500 feet to the water's edge.

3. All slops, garbage, night soil and any other wastes whatsoever from buildings within 500 feet of the water's edge shall be removed at least 3,000 feet from the quarry before being disposed of.

4. No person shall be permitted to throw any refuse or substance into the water of the quarry.

5. That the source of supply shall be abandoned, or purified, in a manner satisfactory to the State Board of Health at any time it should become dangerously contaminated in the opinion of said Board.

SUGGESTED RULES AND REGULATIONS FOR THE PROTECTION OF THE QUALITY OF THE PUBLIC WATER SUPPLY OF PLYMOUTH.

1. All surface drainage from the vicinity of buildings or roadways shall be effectually diverted from the quarry.

2. No cesspool or vault shall be permitted nearer than 500 feet to the water's edge.

3. All slops, garbage, night soil, and any other wastes whatsoever from buildings within 500 feet of the water's edge shall be removed at least 3,000 feet from the quarry before being disposed of.

4. But one boat, to be used as a caretaker's boat, shall be permitted on the water in the quarry, and under no circumstances shall members of the fishing club or anyone else use this boat to fish from.

5. No person shall be permitted to throw any refuse or substance into the water of the quarry.

6. No bait other than spoons and live minnows shall be used in fishing in the quarry.

REPORT ON PROPOSED WATER SUPPLY FOR SHAWNEE.

On November 17, 1908, Messrs. Bradbury and Shute, of Columbus, consulting engineers for the village of Shawnee, submitted plans and specifications for a public water supply for that village, to receive the formal action of the State Board of Health. The plans were referred to the engineering department, and the following report was made:

The village of Shawnee lies in the south-central portion of Perry County, on a small tributary of the Hocking River known as Shawnee Run. The area within the corporation limits of the village is three and one-sixteenth square miles. The population is locally estimated at about 2,800, which, when compared with the United States census reports, indicates a very slow growth during recent years. It is believed by some that there has been of late an actual decrease in population.

The country in and about Shawnee is very hilly, and the village itself is situated on the top and slopes of a nearly isolated knob which rises to a height of about 200 feet above the neighboring stream valley. Shawnee has very little in the way of public improvements at the present time. There are in all about four miles of streets, either unimproved or having macadam paving in a poor state of repair. The streets are also poorly graded; this, of course is primarily due to the difficulties imposed by the local topography, but is in part due to the lack of civic enterprise.

The sanitary standards, as indicated in a report of the State Board of Health relative to unsanitary conditions in the village, under date of May 8th, 1908, are at a low ebb, and the inhabitants in general have little inclination toward neatness and cleanliness about their premises. Privies in all parts of the town are poorly constructed and in a dilapidated condition. Many of them are very near wells and springs which are used for drinking and general domestic purposes. That some of these wells and springs are injuriously influenced by the proximity of such contamination is evidenced by four analyses of well waters which were made in connection with the investigation above referred to. Owing to the difficulty of securing water from private wells, which must be dug or drilled to great depths before a sufficient quantity is encountered, and owing to the generally unsatisfactory yields of existing private and quasi-public wells, the village early in 1907 actively took up the consideration of installing a public water supply. Another strong reason for the agitation in favor of a public supply was the fire protection which a water works system would afford.

PRELIMINARY INVESTIGATIONS AND INFORMAL ADVICE OF THE STATE BOARD OF HEALTH.

Early in 1907, the village authorities drilled two test wells in the valley of Shawnee Run near the municipal electric light plant, and under date of May 27, 1907, made a written request to the State Board of Health for an examination of the wells. In view of the circumstances, it was deemed wise to permit the local authorities to submit a sample of the water from the wells before sending a representative to Shawnee. The analyses indicated a water decidedly dangerous from a sanitary point of view, and the village authorities were informed to this effect. (For analyses see Laboratory Report.)

During the early part of 1908, the village authorities engaged the services of Messrs. Bradbury and Shute of Columbus, consulting engineers. In a communication under date of April 11, 1908, the consulting engineers requested an additional analysis of the two test wells, stating that in their opinion the samples had very likely been contaminated during collection. In view, however, of the unsatisfactory location of these wells with respect to the probable surface and subsurface drainage of the village, the request was refused and it was further advised that a new site be chosen.

After a careful examination of the surrounding country, the consulting engineers recommended a location in a ravine to the northwestward and about one-fourth mile distant from the built-up portion of the village. This site was inspected by a representative of the State Board of Health on May 15, 1908, at the time of the investigation relative to unsanitary conditions in the village. The site seemed in every way to be satisfactory and not likely to be influenced by surface contamination, either at the present time or in the future. Under date of June 24, 1908, a letter was received from the village clerk, requesting a visit by a representative of the State Board of Health for the purpose of assisting the village to select a site for water works wells satisfactory to the Board. In view, however, of the inspection already made by a representative, the village clerk was advised that if a sufficient quantity of water could be obtained in the locality selected by the consulting engineers, it would probably meet with the approval of the Board; and the village was advised to drill a test well before a personal visit was made. The offer was at the same time made that if the quantity or quality of water from such test well proved unsatisfactory, the Board would be willing to send a representative to assist in determining upon another site. A test well was accordingly driven to a depth of 400 feet, but without encountering water in appreciable quantities.

At this juncture the consulting engineers requested a personal visit, which was made August 11, 1908, in company with a representative of the engineering firm and the board of trustees of public affairs. As a result of this visit, the board of trustees of public affairs were informally advised under date of August 12, 1908, that a tract of land in the valley of Shawnee Run to the southwestward of the village where wells might be located at least 400 or 500 feet distant from dwellings, buildings, or other sources of possible contamination, would probably meet with the approval of the Board. In pursuance of this advice, a test well was sunk in the general locality indicated. The well was pumped for a period of time sufficient to insure a satisfactory sample, which latter was sent to the laboratory August 31, 1908. The analysis proved satisfactory from a sanitary standpoint, and the board of trustees of public affairs of the village was advised to this effect September 19, 1908. Following the success of the test well, the site was definitely adopted for the public water supply wells.

PROPOSED PUBLIC SUPPLY.

SOURCE.—The tract of land, as already noted, lies to the southwestward of the village and south of the tracks of the Z. & W. Railroad, in the valley of Shawnee Run. The tract comprises seven to eight acres and is being acquired by the village through condemnation proceedings. A group of seven wells have been drilled, all reaching a depth of about 140 feet. All wells of the group are at least 400 feet distant from any habitation. The original test well, which is a type of all the other wells, penetrated the following formation:

Material.	Thickness of Stratum.	Distance from Surface to Bottom of Stratum.
Clay	21 feet	21 feet
Shale	20 feet	41 feet
Flint rock (so-called)	1 foot	42 feet
Sand rock	5 feet	47 feet
Sandy shale	59 feet	106 feet
Black slate	34 feet	140 feet

Water was encountered throughout the drilling, but no considerable quantity was met with until the flint rock had been penetrated. At this point a rather strong flow was encountered, which rose under sufficient artesian pressure to cause it to rise to within 2 to 16 feet of the surface of the ground. This variation is in part due to the variation in surface elevation, but it is estimated that the variation of the actual water level in the several wells amounts to about 8 feet. Practically the entire yield of the wells comes from the sand rock and sand shale, which latter may be better described as alternating strata of sandstone and shale thinly bedded. The wells are all 6 inches in diameter and are cased with 6-inch galvanized well casings to a depth of 26 feet below the surface. The quantity of water available from each well, as indicated by pumping tests, is in the vicinity of 20 to 30 gallons, and these pumping tests were so conducted as to lower the level of the water in the wells to 75 feet below the surface. It may be recalled that the pumping tests were conducted during extremely dry weather and showed no appreciable diminution in yield. It is probable that during seasons of ordinary rainfall the yield may be somewhat larger than the above. The exact character of the underground reservoirs in which the water is stored could not be ascertained with any degree of definiteness, yet it is believed, owing to the fact that neighboring wells influenced each other to but a slight degree during the pumping tests, that the water is derived principally from fissures and crevices in the rock and not to any great extent by percolation through the body of the rock itself. Nothing could be ascertained as to the watershed from which the ground supply is gathered, nor anything as to the danger from contamination reaching the wells by subsurface drainage from the village, yet it is believed that the impervious strata of flint rock and the overlying clay are general in this locality and should form ample protection against such subsurface contamination.

QUALITY OF WATER.—But one analysis is available for judging of the quality of the proposed public supply. This analysis, however, indicates a water quite satisfactory in every respect. There are practically no indications of contaminating influences. The water is somewhat hard, but scarcely above the average for Ohio ground water. Further, this hardness is all in the form of carbonates or temporary hardness, which renders it a fairly suitable water for boiler use or other industrial purposes. The only characteristic of the water which is likely to give rise to complaint is the iron content which is sufficient to give the water a slight turbidity and cause moderate staining of plumbing fixtures. Much of the iron may be expected to be removed by aeration afforded by the air lift and sedimentation in the storage reservoir.

QUANTITY OF WATER REQUIRED.—It is estimated by the consulting engineers that not more than 1,000 persons will become water takers within the next several years, and that the number of water takers, as far in the future as can reasonably be provided for, will not exceed 2,000 persons. As will be noted under the discussion of the source of supply, the yield of the wells based upon a conservative estimate will reach 200,000 gallons per twenty-four hours during dry periods. This quantity should be able to meet all domestic needs for a number of years to come. The quantity of water available by direct pumping is not sufficient, however, for adequate fire protection, and hence it has become necessary to provide a considerable storage capacity. This storage is afforded by a concrete collecting well of 100,000 gallons capacity at the pumping station and an elevated steel tank of equal capacity at the opposite end of the village. With the aid of the storage provided, it is possible to use one ordinary fire stream indefinitely and four fire streams discharging at the combined rate of 1,440,000 gallons per day, or 1,000 gallons per minute, for a period of two hours.

DEVELOPMENT OF SUPPLY.—The works to be installed for the development of the supply comprise (1) air lift equipment for the seven wells, (2) a system of collecting piping for conveying the water discharged by the air lifts, (3) a collecting and storage reservoir which receives the discharge from the system of collecting piping, (4) pumping machinery, including an air compressor and a power pump each driven by a separate gas engine, (5) a distribution system, and (6) an elevated steel storage and equalization tank connected with the distribution system.

COLLECTING RESERVOIR.—The collecting reservoir is a structure 29 feet and 6 inches in diameter, inside measurement, and 10 feet 6 inches in depth to the flow line, thus giving a capacity of about 50,000 gallons. It is to be built of brick laid with thick joints of Portland cement mortar. The bottom will be one foot in thickness and the sides eighteen inches in thickness. Special attention will be given to making the structure water tight. The reservoir is covered by means of a conical wooden roof. The top, which stands a few feet above the surface of the ground, is at a sufficiently high elevation not to be overtopped by flood waters in the nearby creek. As soon as funds are available, it is proposed to build a duplicate reservoir to afford additional protection against fire.

PUMPING MACHINERY.—The pumping machinery will occupy portions of the present municipal electric lighting plant. The type of machinery has not yet been decided upon, but the general requirements are as follows:

There is to be an air compressor driven by a gas engine and capable of furnishing sufficient air at sufficient pressure to pump from the wells at the rate of 200 gallons per minute, or 288,000 gallons per twenty-four hours. For pumping from the receiving reservoir into the distribution system there is to be one power pump driven by gas engine and capable of pumping 300 gallons per minute, or 432,000 gallons per twenty-four hours. The pump is to be equipped with a revolution counter, and indicating gages are to be placed on both suction and discharge. Natural gas will be used for operating the engines. The entire pumping equipment is to be housed in a room having a floor space of 15 by 28 feet.

Fire protection will be afforded by twenty-two double fire hydrants. It is estimated that the number of services which will be connected with the mains during the first year after the introduction of the public supply will be 201, including one hotel, 30 business blocks, and 170 residences. The service pipe will be made of lead, iron, and brass, probably very little of the last.

ELEVATED STEEL TANK.—Additional storage for fire emergency and equalization of pressure in the distribution system will be afforded by an elevated steel tank having a capacity of 100,000 gallons. The tank will be located in the northern part of the built-up portion of the village on top of the hill upon which the village is situated. It is about 1,400 feet in direct line from the pumping station and about 2,000 feet as measured along the most direct pipe line, all of which is eight inches in diameter. The detail design of the elevated steel tank will be largely left to the successful bidder for this work, but the general conditions to be fulfilled are as follows:

The bottom of the tank is to be forty feet above the ground and the elevation of the surface of the water at the capacity line is to be seventy-five feet above the ground. The bottom of the tank is to be connected with the mains by means of an eight-inch vertical riser, suitably protected against freezing by a wooden casing and packings. The tank is to be built entirely of steel and to rest on four steel columns suitably braced. A roof is to be provided, presumably to prevent the entrance of birds, and an iron ladder is to be furnished to give access to the tank for inspection, cleaning and repairs.

Pressure.—An indication of the pressure available in the distribution system is obtainable from the following elevations, all of which are referred to sea level:

Top of wells	Elv.	770
Flow line of storage reservoir at pumping station	Elv.	790
Center line of pump for high pressure service	Elv.	790
Ground at elevated tank	Elv.	925
Capacity line in elevated tank	Elv.	1000

It will be seen from the above that the pressure in the distribution system with elevated tank full will vary from 32.5 pounds to 91.0 pounds.

Cost Data.—The estimated cost of the water works is itemized as follows:

Wells	$ 1,000
Collecting works, including storage reservoir	1,400
Foundations for machinery	100
Pumping equipment	5,600
Distribution system, including fire hydrants and cut-off valves	8,300
Elevated steel tank	5,600
Engineering and contingencies	1,000
Total	$23,000

At a meeting, held December 10th, 1908, the State Board of Health approved a proposed water supply for the village of Shawnee to be obtained from wells located southwest of the village and south of the tracks of the Z. & W. Railroad in the valley of Shawnee Run, as shown on plans and specifications submitted by Messrs. Bradbury and Shute, consulting engineers, on November 17th, 1908; provided, that the village take steps to prevent the location of habitations or other buildings within at least 300 feet of any well.

REPORT ON PROPOSED WATER SUPPLY FOR SWANTON.

On October 31, 1907, a request was received from Mr. William G. Clark, consulting engineer, for an investigation of a proposed source of water supply for the village of Swanton. Accordingly, one of the assistant engineers accompanied by the consulting engineer visited Swanton November 1, 1907. Based on an informal report of the assistant engineer, the village was advised to seek a new location for wells. On March 18, 1908, the assistant engineer made a second visit to Swanton to aid the local officials and their now consulting engineer, Mr. George Champe, in finding a site which would meet with the approval of the State Board of Health; and this was followed by a third visit on May 28, 1908, for the purpose of inspecting and collecting a sample from a test well located on a site as above selected. As the test well did not prove satisfactory, a fourth visit was made on August 26, 1908, to sample and be present at a pumping test of the original wells. The following report was submitted:

The village of Swanton is in the extreme eastern part of Fulton County and on the north branch of Swan Creek, a small stream having a fairly uniform flow throughout the year. The area within the corporation limits is approximately three-fourths square mile. The population, as estimated from the last two census reports, is about 1,100, or a concentration of about 1,600 per square mile. The growth of the village is said to be moderate.

PROPOSED SUPPLY.

Sometime during 1906, as a result of agitation for a public water supply that would meet requirements for domestic consumption and also serve as a protection in case of fire, the village sold $16,000 worth of bonds. Without submitting the matter to the judgment of a consulting engineer or requesting the advice of the State Board of Health, the local authorities proceeded to drill wells to serve as a source of public water supply within and near the eastern edge of the built-up portion of the town. A large supply of apparently good water was found near the surface of bed rock. This supply was submitted to the State Board of Health for approval through Mr. William G. Clark, of Toledo, consulting engineer, who was engaged to draw up plans for developing the supply. An informal report was submitted, based on the first inspection made November 1, 1907, which indicated that the proposed site was not acceptable as judged in the light of the past policy of the State Board of Health. Therefore, the secretary of the Board advised the village authorities to seek another source of supply.

In January, 1908, an attempt was made by the village authorities to secure a supply from a lower stratum 275 feet below the surface, in one of the existing wells. A sample was collected January 10, 1908, and shipped to the State Board of Health for analysis. The results of analysis showed excessive mineral content which rendered the water totally unfit for domestic purposes.

Following this another consulting engineer was engaged, and subsequent investigations were made under his direction.

Three wells were drilled by the local authorities.

SUMMARY AND CONCLUSIONS.

It is proposed to obtain a public supply for general domestic purposes from drilled wells penetrating the drift and deriving their supply from a water-bearing stratum at or near the surface of the bed rock.

An emergency supply, primarily for fire protection, may be obtained from a water-bearing stratum in the bed rock at a depth of about 300 feet. This supply would be objectionable for general purposes on account of its mineral characteristics.

The proposed wells are on property purchased by the village for the purpose and are within the built-up portion of the city. Within 100 feet of the wells are seven privies and there are more in the neighborhood at somewhat greater distances. The water-bearing stratum is apparently protected by a thick stratum of impervious clay, which will probably prove an effective barrier against pollution from the surface. Heavy pumping of the public supply wells will probably cause the failure of a number of private wells which may subsequently be found convenient for the disposal of sewage and other domestic wastes, and mineral pollution may be drawn in from abandoned oil wells in the vicinity which have not been properly plugged. These contingencies should be carefully guarded against.

Analysis of one of the proposed wells and of two nearby wells deriving their supply from the same water-bearing stratum indicate the water to be of good quality from a sanitary point of view.

In view of the rather undesirable location of the proposed wells, it would seem that approval should be granted only on condition that privies within 500 feet of the proposed wells be reconstructed and maintained in accordance with appended suggested rules and regulations, that cesspools be abolished altogether, and that the village seek a new supply whenever in the opinion of the State Board of Health the present supply becomes dangerous for domestic consumption.

In connection with the installation of the public water supply, there should be considered the matter of rearranging the sewerage system in such manner that the increased sewage flow, which will undoubtedly follow, will be conducted to a point where no nuisance will be created and where it can if necessary be subjected to purification.

At a meeting of the State Board of Health, held September 23, 1908, the proposed water supply for the village of Swanton from wells, located as shown on plat of the village submitted by Mr. George Champe, consulting engineer, was approved, upon the following conditions:

1. That samples of the water be submitted to the State Board of Health for analysis at regular intervals of not greater than six months.

2. That the council pass an ordinance prohibiting the use of any abandoned wells in the village for the purpose of disposing of domestic

wastes, and providing for the abolition of cesspools and the reconstruction and maintenance of privies within 500 feet of the public supply wells, in accordance with suggested list of rules and regulations appended.

3. That if in the opinion of the State Board of Health the public water supply becomes so contaminated as to be dangerous to health, the village shall seek a new supply.

4. That detailed plans showing the method of developing the supply be submitted to and receive the approval of the State Board of Health.

SUGGESTED RULES FOR SWANTON FOR CONSTRUCTION OF PRIVIES.

1. All privies shall be provided with water tight receptacles resting at or above the surface of the ground and so placed that all fecal matter is discharged into them.

2. The receptacles in which fecal matter is contained shall be entirely enclosed in a suitable compartment under the seats, which will prevent the admission of flies, but shall be so constructed as to be readily accessible for inspection and the removal of receptacles.

3. All seats shall be provided with hinged covers which will not remain open unless held open.

4. An amply supply of powdered slaked lime or dry loamy earth shall be accessible for sprinkling over the fecal matter after each use of the privy.

5. As soon as full, receptacles shall be emptied and the material removed at least one-fourth of a mile beyond the city limits and buried in the ground.

6. It shall be the duty of the health officer or his representatives to inspect all privies not less frequently than once in two months, and to prosecute persons found not complying with the above rules.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR WILMINGTON.

On August 28, 1908, a communication was received from Mr. J. C. Martin, vice-president and manager of the Wilmington Water & Light Company, requesting an examination and approval by the State Board of Health of wells to be used as a source of additional public water supply. The necessary examination on the ground was made by one of the assistant engineers on September 9, 1908. The following report was submitted:

It will not be necessary in the following report to give in detail a description of the public water supply, as this has already been done in a report under date of July 6, 1907, prepared in connection with the general investigation of public water supplies throughout the state. It will be profitable, however, to review briefly the history of the public water supply and previous investigations and actions of the State Board of Health.

The matter of the installation of a public water supply for the village of Wilmington was first brought to the attention of the State Board of Health in 1902. At that time wells Nos. 1 and 2 of the present supply were drilled and approval of the use of same was requested of the State Board of Health. The engineer of the Board visited Wilmington November 26, 1902, and reported favorably upon the use of these wells. The Board voted to approve the supply, and the following letter announcing this action was sent to the water company under date of December 9, 1902.

Mr. J. C. Martin, Secretary Wilmington Water, Light and Ice Co., Wilmington, Ohio:

DEAR SIR:—The State Board of Health has considered your application for approval of a water supply proposed for the village of Wilmington, to be obtained from drilled wells in the northeast corner of the village, at the intersection of Columbus Street and the Cincinnati & Muskingum Valley Railroad.

You are hereby notified that the Board has voted to approve such supply upon the condition that all surface water be effectually excluded from the wells.

Yours truly,
(Signed) C. O. PROBST,
By order of the Board. Secretary.

It soon developed that the yield of the two wells approved by the Board was not sufficient to meet the demands of a community the size of Wilmington, and therefore the public water works were not completely developed at that time. A quantity of water was, however, pumped through a small distribution system and used almost exclusively for street sprinkling.

In 1905 the matter of building a complete water works system for the village was again taken up. An increase in the supply was sought by drilling a well near the corner of Locust and Spring streets in the midst of the built-up portion of the village. Samples of the water from this well and also from an existing well on the corner of Locust and South streets were submitted to the State Board of Health for analysis. The analyses indicated the waters to be of unsatisfactory quality from a sanitary point of view, and the water company was informally advised to seek a source of supply in a more satisfactory location.

During this search for an additional water supply, the engineer of the Board made two visits to Wilmington, namely, on April 29 and May 11, 1905. At his suggestion, three wells were drilled on farm land to the northeastward of the water works property. These wells are designated as 3, 4, and 5. The quantity of water yielded by them led the water works authorities to believe that they would meet all demands at all seasons. Approval of the new wells was not formally requested of the State Board of Health at the time they were drilled, as it was desired to first make sure that the quantity yielded by them would be sufficient. In 1906, being satisfied upon this point, the water company proceeded to systematically develop the supply and completed this work about the first of July of that year; but it was not until June 6, 1907, that Mr. J. C. Martin, secretary of the water company, requested of the State Board of Health formal approval For the purpose of making a re-examination on the ground, Wilmington was visited June 12, 1907, by the chief engineer, and again on June 22, 1907, by the assistant engineer. Basing its action on the report submitted, the Board voted to approve the supply and so notified the water company in the following letter of August 19, 1907:

The Wilmington Water and Light Company, Wilmington, Ohio:

DEAR SIRS:—In compliance with the request of Mr. J. C. Martin, Secretary of the Wilmington Water and Light Company, June 6, 1907, for a formal approval of the Wilmington water works, the State Board of Health caused an examination and report to be made of same.

You are hereby notified that the Board has approved the water supply of the Wilmington Water and Light Company, and also the use, for water works purposes, of land owned and controlled by that company, bounded on the northwest by Prairie Avenue, on the southeast by the C. & M. V. Railroad, on the southwest by Wall Street and on the northeast by the Lewis farm (as shown on plan filed with the State Board of Health), provided that no house or source of contamination be located within 500 feet of any well.

In order that any possible deterioration in the quality of the water may be detected, the Board would advise that you submit samples of the aggregate supply, and also samples from well No. 2, to the State Board of Health for analysis, at least once a month during the coming year. Yours truly,

(Signed) C. O. PROBST,
Secretary.

By order of the Board.

During the dry period of the present summer it was made evident that the combined yield of the five existing wells was not able to meet the demands of the village. It was estimated that the maximum amount of water that could be derived from these wells was but 20,000 to 30,000 gallons per twenty-four hours, whereas the normal daily consumption of the village during the summer season amounts to 150,000 to 160,000 gallons.

Inasmuch as the franchise of the water company required that an ample supply of pure water be furnished the village at all times, there was great dissatisfaction and an insistent demand that the water company secure an additional supply.

The first attempt to secure more water was from wells on land to the northeastward of the existing wells and also in the vicinity of the two original wells drilled in 1902. These attempts were unsuccessful.

It was known that several industrial concerns about 1,500 feet or so in a southwesterly direction from the water works plant were obtaining considerable quantities of water from the rock. As the water company was able to get water rights on the right of way of the C. & M. V. Railroad in this vicinity on very reasonable terms, it was determined to sink a test well. This test well, designated as well No. 6, gave such a large yield of water that arrangements were immediately made for drilling additional wells, and temporary provision was made for augmenting the public supply from these wells until action thereon should be taken by the State Board of Health.

Proposed Additional Supply.—The wells from which it is proposed to obtain an additional water supply are located in a built-up part of the village in the valley of the same small run in which the other water works wells are located, but about 1,500 feet distant in a downstream direction from the water works pumping station. Practically no land is controlled by the water company in the vicinity of the wells. The agreement with the railroad company as far as could be learned did not call for any special protection of the site upon which the wells are located.

The three new wells, designated as Nos. 6, 7 and 8, one of which was not completed at the time of investigation, are all located near the intersection of Main and Grant streets. The north side of Main street has every lot built upon with residences, practically all of which have outdoor privies. The district to the southward is somewhat more open, yet within a few hundred feet there are several large industrial establishments. In general, it may be said that the surface indications are very unsatisfactory and that unless it can be demonstrated conclusively that the strata from which the water is derived are protected from surface influences, the supply cannot be considered acceptable.

That a large degree of the protection mentioned above exists is indicated by the following descriptions of the formations penetrated.

Well No. 6 presents approximately the following formation:

Blue clay, with perhaps some interspersed sand or gravel...	48 feet
Close grained Clinton limestone..........................	23 feet
Soft porous limestone (water-bearing)....................	20 feet
Red sandstone (sometimes spoken of as iron ore)..........	5 feet
Alternate layers of soft and hard limestone (former water-bearing).......................................	86 feet
Total.......................................	162 feet

It was stated that in penetrating the close grained Clinton limestone, no water was encountered and that it was necessary to introduce water into the well hole to assist the drilling.

Well No. 7 gave approximately the following formation:

Soil and clay	41 feet
(Much the same formation is found in well No. 6.)	
Shale..	2 feet
Clinton limestone......................................	20 feet
Porous and soft limestone..............................	17 feet
Red sandstone	5 feet
Alternate layers of soft and hard limestone...............	67 feet
Total....................................	152 feet

As already noted, well No. 8 has not yet been completed and the record cannot be given.

It was found that the soft limestone strata yielded the water, and as far as could be learned the water came in approximately equal quantities from all such strata. It should be noted that the record of the drilling was not as accurately kept as would be desirable and that the above figures must be taken as only approximate. Both of the completed wells are provided with casings that extend into the Clinton limestone and thus case off all water from the drift. The water in both the wells is said to stand within 15 to 18 feet of the surface of the ground when not being pumped.

Well No. 1 had been pumped for four and one-half days before the time of investigation. The pumping was practically continuous, though occasional stops of an hour or two were made for repairs and readjustment. The rate of pumping, as determined by permitting the water to flow into a large oil barrel, was estimated at about 70,000 gallons per twenty-four hours. Inasmuch as the flow of water from the wells is quite unsteady, the method of measuring the flow by means of a barrel is rather unreliable. The flow from well No. 7 was measured in the same way and indicated a discharge of about 100,000 gallons per twenty-four hours. It was stated that in pumping at this rate the water in both the wells was lowered some 30 feet, but here again the measurements were very crude, being taken several hours after pumping had ceased; hence the figures are unreliable.

An attempt was made to obtain some data which would indicate the extent to which the present yield of the wells might be counted upon. Within about 500 feet to the southward of well No. 7 is a well belonging to F. E. Langdon, which was drilled in 1892 and which since that time has been drawn on to the extent of about 8,000 gallons daily. This well penetrates essentially the same formation as the proposed public supply wells. When first drilled, the water rose to within about 14 feet of the surface. Five years later there was occasion for repairing the pump over this well and it was observed that the water level had fallen to 19 feet below the surface. One week after the pumping of well No. 7 of the proposed public supply wells, it was observed that the water level in the Langdon well had fallen to 40 feet below the surface. An odd circumstance in connection with the water from the Langdon wells is that it is said to form a hard scale, whereas the water in the proposed public supply wells is free from incrustants. This would of course tend to indicate a different source of supply, yet the steady lowering of the ground water is significant.

About 200 feet distant in a southeasterly direction from well No. 6 is the well of the Irwin Augur Bit Company. This well is 69 or 79 feet deep and is said to penetrate approximately the same formation as the Langdon well. When first drilled in 1893, the water in this well was encountered at sufficient pressure to flow slightly from the top. This artesian flow, however, soon ceased and the surface of the water in the well has been gradually lowered. The present depth to water is not known. At any rate the water cannot be lifted by a pump placed at the surface of the ground, which would indicate a depth below the surface of at least 25 feet.

Perhaps the most significant instance of the lowering of the ground water in the vicinity of the proposed wells is that of the Chancellor well located about 200 feet to the westward of well No. 7. The water from this well it is said does not form a hard scale, which is a good indication that it is of the same character as that from the public supply wells. The date when the well was drilled is not known, but it is said that the water stood within about 15 feet of the surface. A measurement was made on date of investigation, and it was found that the water then stood at fully 40 feet below the surface. In speaking of this well, mention must be made of the fact that its casing stands below the surface of the ground and may thus admit surface drainage into the water-bearing strata from which the proposed public supply wells derive their supply.

None of the wells cited have been pumped at any where near the rate at which it is proposed to pump the proposed public supply wells, and it would therefore seem that the underground reservoir from which the water is drawn may in time be exhausted. Recent intelligence from the local health officer (October 7th) emphasizes this danger, for it was found that the yield of the new wells decreased so rapidly that it was necessary to drill them 50 feet deeper and also arrange for the drilling of additional wells.

As to the quality of the water from the proposed public supply wells, it would seem that it is at present safe for domestic consumption. There are, however, several unsatisfactory indications, namely, the high oxygen consumed and the rather high number of bacteria. Both albuminoid ammonia and free ammonia are present in considerable quantities, but the free ammonia at least must be attributed to mineral sources. The waters show an entire absence of nitrites and nitrates. Chlorine is present in such large quantities as not to be of any value in interpreting the sanitary quality of the water. Perhaps the most serious objection to the water at the present time is the high iron content which is sufficient to form a heavy precipitate of iron rust and will no doubt give rise to complaint owing to the staining of plumbing fixtures and fabrics in the laundry. The total hardness of the water is rather high and is somewhat higher than that which obtains in existing public supply wells. On the other hand, there is a complete absence of incrusting constituents which form troublesome scale when the water is used in boilers.

It may be remarked that there are certain points of resemblance between the chemical analysis of the proposed new wells and those of wells at the corner of Locust and Spring streets and Locust and South streets, drilled in the early part of 1905. This resemblance suggests a common source, and as the former wells were without doubt grossly polluted, the proposed new wells should be regarded with suspicion. Continued pumping of the new wells would no doubt create a more rapid flow of water toward them than at present exists, and the pollution which has already been found to affect the wells at the corner of Spring and Locust streets may eventually influence the new wells.

During the investigation, attention was directed to several matters which, while not strictly coming under the head of proposed supply, should be given consideration at this time. On August 15, 1908, a committee of council made an examination of the water works for the purpose of ascertaining to what extent the water company was endeavoring to comply with the stipulations of the franchise. In the report submitted it was pointed out that there were several opportunities for the pollution of the existing supply.

An examination of the standpipe showed that the screen covering thereon was in poor repair and permitted the entrance of numerous birds. At the time the inspection was made, it is reported that there were seventeen dead birds floating on the surface of the water and forty-five live birds flying about in an effort to find their way out. The small ledges on the inside of the standpipe at the joints of the steel plates were covered with bird droppings. The only adequate protection against pollution of the water in the standpipe is a roof with all necessary openings carefully protected against the entrance of birds by fine screens.

It was also observed that the manhole coverings over the wells and sand catchers near the wells were not locked and could with the greatest ease be opened by any one. It is further possible during floods in the stream near the wells, for flood water to find its way into the cisterns surrounding the wells. The well water can readily be made safe from this danger by providing watertight manhole covers fastened down with bolts and gaskets.

In return for water rights, the water company permits the owners of the land on which its wells are located to have hand pumps over these wells for watering cattle. As pointed out in a former report, there is some danger from this practice, first because the wooden casings about the suctions of these pumps do not afford adequate protection, and further, the priming of the pumps when out of repair may permit water used for this purpose to flow back into the well. The pumps should be removed and water should be furnished through service connections from the mains.

At a meeting, held October 20th, 1908, the State Board of Health approved a proposed additional water supply for Wilmington to be obtained from wells lying between the C. & M. V. Railroad and Main Street, for a period of one year, during which time the water company will be expected to take steps to secure, if possible, an additional supply rom a location more remote from the village, and farther removed from possible sources of contamination.

SEWERAGE AND SEWAGE PURIFICATION

REPORT ON PROPOSED SEWERAGE FOR DISTRICT NO. 3, ASHTABULA.

On December 3, 1907, there was received from Mr. Lewis A. Amsden, city engineer of Ashtabula, a plan showing proposed sewerage for Sewer District No. 3. The chief engineer visited Ashtabula on December 17, 1907, and in company with the city engineer inspected the territory in question. The following report was submitted:

The city of Ashtabula is in the north-central part of Ashtabula County and has a population of about 15,000. The area within the corporation limits is approximately $5\frac{1}{2}$ square miles. The city is divided into two parts of nearly equal size: One lies in the northerly part bordering the lake, and is known as Ashtabula Harbor; the other is about two miles inland and is known as Ashtabula proper. Ashtabula in general, is clean and well kept, and street and sewer improvements are continually being made. Ashtabula Harbor, however, contains a large foreign population, and the conditions in this portion of the city are by no means of the best.

The water supply of Ashtabula, furnished by a private company, is taken through an intake located 2,600 feet from the shore and about 3,000 feet southeast of the mouth of the Ashtabula River. At the present time the water is being used in an unpurified state, and typhoid fever has in the past been attributed to its use. Recently, however, the water company has had made plans for a filtration plant, which plans have been approved by the State Board of Health. According to the franchise under which the water company operates, these plans will have to be carried out in the near future.

The city is divided into three main sewer districts. District No. 1 comprises the larger part of Ashtabula proper and the southwesterly portion of the corporation. There are about 7,500 people tributary to the sewers, which are on the separate plan. The main outlet for District No. 1 is through a 20-inch sewer in West Street and Mary Street, which discharges into the Ashtabula River at the foot of the last named street.

Sewer District No. 2 comprises Ashtabula Harbor, the northerly portion of the corporation. The main sewer draining this area discharges into the Ashtabula River at Bridge Street. At the present time there are from 2,000 to 3,000 people using these sewers. This district is sewered on the combined plan.

Sewer District No. 3 includes the territory lying principally in Ashtabula proper. in the southeasterly portion of the corporation. There are at present about 1,400 people in this district using the sewers, which are on the separate plan. The main outlet sewer in Mary Street, for District No. 3, serves also as the outlet, above mentioned. for District No. 1.

The proposed plans call for enlarging the 15-inch main sewer in District No. 3 and also in District No. 1 and replacing it by 4,500 feet of 20-inch main sewer. In addition, this sewer will be continued in District No. 1 by 950 feet of 12-inch, 950 feet of 10-inch, and 350 feet of 9-inch pipe. The new sewer will be used, as at present, for domestic sewage only, no storm water or roof water being admitted. The sewer is designed to provide for a flow of 200 gallons per capita, based on 12,000 people ultimately using the sewers in the district served.

The new enlarged sewer will discharge through the existing outlet at Mary Street. The discharge of sewage at this point is said, on reliable authority, to cause objectionable conditions when the river is at its low stages. At the time of inspection, the river was high. The discharge of sewage at this point as well as at Ashtabula Harbor adds contamination to the river, and hence makes more difficult the work of purifying the water for the public supply.

March 9, 1908, the Board approved this plan, showing proposed sewerage for Sewer District No. 3, submitted December 3, 1907, provided:

1st. That the city within three years present plans to the State Board of Health for approval, providing for the purification of the sewage from the entire city; and,

2nd. That approved plans be carried out, and sewage purification works placed in satisfactory operation within five years from March 9, 1908.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR BUCYRUS.

Proposed sewerage for District No. 6, Bucyrus, came to the attention of the State Board of Health in June, 1907, through a newspaper article. A letter to the local authorities requesting information was answered on September 18, 1907, by a letter from Mr. C. A. Guiss, city engineer, accompanied by blue print and information blank duly filled out. On October 16, 1907, the assistant engineer visited Bucyrus and made an inspection of the locality involved. A report of this inspection was held until the present time, pending more complete information.

On April 7, 1908, plan for a proposed sewer in Plymouth Street tributary to Finley Run was received.

The assistant engineer visited Bucyrus on April 15, 1908, to obtain additional data in connection with proposed sewerage for District No. 6, and also to investigate the proposed sewer in Plymouth Street. The following report was submitted:

The city of Bucyrus is southwest of the central portion of Crawford County, of which it is the county eat, and lies on the Sandusky River. The population as estimated from census reports is approximately 7,000. The area within the corporation limits is about 2¼ square miles. The water supply is owned by a private company and is derived from an impounding reservoir formed by the construction of a dam across a small tributary of the Sandusky River. Only when turbid the supply is filtered by means of a mechanical filter plant. Plans for the filtration plant were approved by the State Board of Health, but the conditions of approval have never been complied with.

EXISTING SEWERAGE.—Practically the whole of the built-up portion of the city is accessible to sewers, but probably less than half the population is tributary for sanitary purposes. The introduction of modern plumbing has been rather slow and outdoor privies are still used in even the thickly built-up portions of the city. The sewers are used primarily for sink and cellar drainage. The exact proportion of the whole population tributary in this manner could not be ascertained, but is probably in the neighborhood of eighty per cent. The sewers have fourteen outlets along the water front, which discharge into the river at various points. Most of the outlets are small and have but little effect on the appearance of the stream. About three-fourths of the area of the built-up portion of the city is tributary to what is known as the "main sewer," which discharges very large quantities of apparently strong sewage at a point below where the built-up portion recedes from the river banks. Thus foul odors in the vicinity of the outlet do not give rise to local complaints.

The sewers are said to be generally well built, either of brick or vitrified sewer pipe, to have good grades, and to be well ventilated through perforated manhole covers. All of the catch basins are trapped and give no trouble due to the dissemination of disagreeable odors. During dry weather the discharge of sewage into the streams causes offensive conditions even above the outlet of the main sewer and has frequently been a source of complaint among residents near the river bank. Below the outlet of the main sewers the stream is excessively foul and is little better than an open sewer. It happens, however, that no houses below this point are near enough to the river to be seriously affected by odors arising therefrom, but from time to time there have been very bitter complaints from riparian owners below the city owing to the unfitness of the stream for stock watering.

PREVIOUS INVESTIGATIONS AND ACTION OF THE BOARD.— Before taking up specifically the proposed sewerage, it will be well to review previous investigations and action of the State Board of Health relative to sewerage in Bucyrus. The first investigation was made by the secretary of the Board in 1895, at the request of the local health authorities. He examined and reported on the pollution of the Sandusky River. In the report it was stated that at this time six to eight sewers discharged into the river at various points, with the result that the stream became extremely foul and unsightly. It would appear that the investigation was made during a period of rather low water. It was learned in connection with this investigation that a measurement of the flow of the stream during the latter part of July, 1894 (also a period of low flow), indicated a discharge of 388,800 gallons per twenty-four hours, which represents a flow of .86 cubic foot per second per 1,000 population based on present population of 7,000. It is generally accepted among sanitary engineers that from 4 to 6 cubic feet per second flow in a stream is necessary to satisfactorily dilute the sewage of 1,000 persons. It will therefore be seen how inadequate the flow of the Sandusky River is for taking care of the sewage of Bucyrus. The report recommended as the most feasible method of remedying conditions the construction of an intercepting sewer for the dry weather flow; the same to be conducted below the city to a site suitable for the location of sewage purification works. An estimate of the cost submitted by the then city engineer indicated that the interceptor could be built for a sum not greatly exceeding $5,000.

In 1897 approval of the State Board of Health was requested for the construction of additional sewers to discharge directly into the Sandusky River. The same were disapproved.

In 1898 a general inspection of the sewers was made by the engineer of the Board in connection with an examination of the watershed of the Sandusky River. The report of this examination confirmed the findings of the investigation made by the secretary of the Board in 1895.

In January, 1905, the city solicitor requested a report on the sanitary conditions of Bucyrus with reference to the necessity for sewage purification. This action was prompted by various suits that were filed against the city at that time by farmers living below. The engineer of the Board visited Bucyrus in January 5, 1905. The report submitted reviewed the past investigations of the Board in considerable detail. Owing to coldness of the weather at time of the engineer's visit, no nuisance was being created, yet there was abundant evidence of an objectionable pollution. The report also pointed out the danger of pollution of the water supplies of Upper Sandusky, Tiffin, and Fremont by sewage from Bucyrus. The report concluded by strongly recommending that a consulting engineer be employed to report on the feasibility and cost of various methods of overcoming sewerage difficulties, among which were suggested the following:

1st. The cost of building an interceptor to receive the dry weather flow only, of the present sewers, together with the cost of pumping this dry weather flow to the proper site for purification works and the cost of such works.

2nd. The cost of a new sanitary system of small pipe sewers for domestic sewage only, to discharge by gravity at purification works, together with the cost of these works. In this case the present combined sewers would be used for storm water only.

3rd. The cost of a new sanitary system of small pipe sewers to discharge at purification works by pumping, together with the cost of pumping and purification works. In this case the present combined sewers would be used for storm water only

4th. The best method of disposing of the various manufacturing wastes and the possible harm to the efficiency of the sewage purification works if mixed with the city sewage.

5th. The flow of all present main sewers, together with the chemical composition of the sewage.

A later inspection (October 16, 1907) showed that the stream below the city was no better than an open sewer.

PROPOSED SEWERAGE FOR DISTRICT NO. 6.—The proposed sewers are designed on the combined plan and are intended to take care of the northwestern part of this city, known as Sewer District No. 6, which corresponds approximately to the Fourth Ward. The tributary area is about fifty acres in extent, and the sewers would serve a present population of about 300. The ultimate population to be served would probably not exceed 1,000 and is not likely to reach this figure for a number of years to come. The outlet of the proposed sewers is planned to be adjacent to the west abutment of the Pennsylvania Railroad bridge.

The district tributary to the proposed sewers is not paved and part of the storm water will be cared for by surface drainage. The primary reason for the construction of the sewers is for the purpose of obtaining cellar drainage. It is claimed that they will not be used for sanitary purposes by more than a small percentage of the population, probably not more than ten per cent. Judging by experience elsewhere, however, it is believed that this estimate is somewhat erroneous, as it is generally found that where cellar drainage is provided it is used to receive wash water, sink drainage, overflows from cesspools, and practically all other liquid domestic wastes.

PROPOSED SEWER IN PLYMOUTH STREET.—It is proposed to construct in Plymouth Street a 15-inch vitrified sewer about 1,600 feet long, to take care of the storm water in this street and to receive the domestic wastes and cellar drainage from about twenty-five families. The total area which will be tributary to this sewer is seven or eight acres, all of which is unpaved although the district is fairly well built up.

The Plymouth Street sewer is to discharge into Finley Run, so-called, which is a small tributary of the Sandusky River and enters that stream from the northward and near the central portion of the city. Some three years ago this run was enclosed by the county commissioners in a concrete conduit about three feet in diameter, and there were permitted to be discharged into it sewage and industrial wastes from the Bucyrus Steel Casting Company and the Carroll Foundry and Machine Works. This virtually converted Finley Run into a combined sewer, plans for which should have been submitted to and approved by the State Board of Health before it was constructed. However, the matter was not submitted to the Board for approval. The Finley Run sewer should, therefore, be considered by the Board as a proposed sewer in connection with the sewer proposed in Plymouth Street.

CONCLUSIONS.

The additional sewage which would be discharged into the Sandusky River from both the Finley Run sewer and Sewer District No. 6, were the construction of the proposed additional sewers permitted, would be comparatively small in quantity and would not add perceptibly to the existing pollution of the river. It should be noted, however, that it is not proposed to build these sewers in accordance with any general plan whereby the entire dry weather flow of sewage may be conducted to a suitable location below the city and there purified.

In view of the fact that the Sandusky River is already grossly polluted, to the injury of farms below Bucyrus and the contamination of the water supply of Upper Sandusky and possibly also the water supplies of Tiffin and Fremont, sewage purification must now be considered a matter of necessity.

At a meeting of the State Board of Health, held April 22, 1908, plans for proposed sewers in District No. 6, and for a sewer in Plymouth Street, Bucyrus, as shown on drawings submitted by Mr. C. A. Guiss, city engineer, on September 18, 1907, and April 7, 1908, were disapproved.

The board of public service was notified that the Board was of the opinion that the city of Bucyrus should take immediate steps looking towards the remodeling of their present system of sewers and for the construction of a satisfactory sewage purification plant.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR PICKAWAY COUNTY INFIRMARY, CIRCLEVILLE.

Plans for proposed sewage purification for the Pickaway County Infirmary were received July 24, 1908, from Mr. N. C. Bohnert, county auditor. Previous to this date, tentative plans had been informally discussed by the county surveyor and the chief engineer of the board. The plans submitted, therefore, embraced most of the suggestions made to the county surveyor. The chief engineer examined the completed plans and the following report was made.

The Pickaway County Infirmary is located three miles from Circleville upon a small stream known as Pauper Creek which enters Hargas Creek one mile below the institution. Hargas Creek in turn flows into the Scioto River four miles farther down. The present population of the institution is about 80 and the plant is designed for a population of 125, which population would probably produce some 6,000 or 8,000 gallons of sewage per day.

It is proposed to locate the plant 240 feet from the residence of the superintendent of the infirmary, on the bank of Pauper Creek. While it would be desirable, on general principles, to locate the plant at a greater distance than 240 feet from the superintendent's house, yet it is not probable that conditions detrimental to health would arise by locating the plant as proposed.

The sewage first passes into a screen chamber containing two screens, one having a ⅜-inch open space and the other a ¼-inch open space. From the screen chamber the sewage will flow into a septic tank which is 18 feet long by 9 feet wide and is divided by longitudinal baffles into three sections so that the sewage will travel a total distance of 54 feet. The depth of the tank below the outlet is 2 feet, but the sewage being held back by the dosing tank rises 2 feet above the outlet before it is discharged; that is, the dosing tank proper and septic tank form one large dosing tank, except that the bottom 2 feet of the septic tank are not drained out. The number of gallons in each dose is about 2,500, which will cover one sand filter to about one inch. The dosing tank is discharged by means of two 5-inch automatic alternating siphons, one leading to each of the sand filters. Either siphon can be cut out of service if desired.

Each of the two filters is 50 feet by 80 feet at the bottom, thus giving an effective area of about 0.2 acre. This will meet the needs of the institution for some time in the future. The filters are to contain, according to the plans, 18 inches of sand and 24 inches of gravel, the quality of each, according to the specifications, to be satisfactory to the State Board of Health. The beds are provided with an ample distributing system and are thoroughly underdrained, the outlet, as above mentioned, leading to Pauper Creek.

August 13, 1908, the Board approved plans for proposed sewage purification for the Pickaway County Infirmary at Circleville, as shown on drawings and described in specifications submitted by Mr. N. C. Bohnert, county auditor, on July 24, 1908, provided, that the layer of sand in the filters be increased by one foot and the layer of gravel decreased by a corresponding amount; and that samples of both kinds of filtering material be submitted to and receive the approval of the State Board of Health before being placed.

REPORT ON PROPOSED SEWAGE PURIFICATION PLANT FOR THE METHODIST HOME FOR THE AGED, AT COLLEGE HILL.

On December 27, 1907, there were submitted by Messrs. Samuel Hannaford and Sons, of Cincinnati, architects for the Methodist Home for the Aged, at College Hill, plans and specifications for a sewage purification plant for that institution. In anticipation of these plans being submitted, the locality was visited on October 16, 1907, by the chief engineer. The plans as finally submitted were amended practically in accordance with the several recommendations made after examining the original plans.

The following report was made:

The Methodist Home for the Aged at College Hill is now in process of construction and will be completed within a few months. The building, when finished, will accommodate 300 or 400 persons, although it is not expected that more than 100 will occupy it in the beginning. The institution is located at the top of a hill which drains abruptly into a small intermittent stream, a tributary of Mill Creek. Below the institution the stream passes through valuable property and near to several houses. It is necessary, therefore, to purify the sewage to a fairly high degree.

The proposed plans for sewage purification comprise a screen chamber, septic tank, dosing chamber, sprinkling filters of stone, and sand filters for the final treatment. The flow of sewage at the beginning is estimated at 10,000 gallons per day; while the capacity of the plant as shown on the plans will be about 20,000 gallons per day. This is ample for present installation. The plant is so arranged and located that it can be doubled in size when necessary.

The screen through which the sewage will first pass consists of vertical parallel bars with open space of 0.5-inch. The dimensions of the septic tank are 6 feet 3 inches by 7 feet 6 inches, thus giving a capacity of 3,500 gallons. The dosing tank is so arranged that each dose will consist of about 200 gallons.

The sewage from the dosing tank is to be distributed intermittently on to the sprinkling filters through a system of cast iron pipes supported over the surface of the material. These filters are two in number, each 10 feet by 15 feet by 5 feet deep, thus giving a total area of 0.007 acre. Working at normal capacity (20,000 gallons per day) the net rate of filtration will be 2,900,000 gallons per acre per day.

There will be six sprinkling nozzles to each filter. The design of the nozzles themselves has not yet been decided upon, but with the large number per unit area proposed it will be easy to secure satisfactory distribution. The specifications state that the filters will be filled with clean broken stone absolutely free from clay, shale, or screenings, and ranging in size from .75-inch to 2.5-inch. It would be desirable to have coarser stone than this at the bottom of the filters.

The sand filters, which are to receive the effluent from the sprinkling filters as fast as it passes through the latter, are two in number, each 10 feet by 30 feet and having a total area of 0.014 acre. The net rate on these will be half the rate on the sprinkling filters. The sand filters are to contain an average depth of five feet of clean lake sand. Each filter can be operated independently if desired.

January 9, 1908, the Board approved these plans and specifications, submitted December 27, 1907, provided:

1st. That the detailed design of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health before the nozzles are placed;

2nd. That the bottom eighteen inches of the stone filters consist of pieces of stone from 2.5 inches to 5 inches in diameter; that the bottom layer of the sand filters consist of one foot of gravel and that samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

3rd. That the plant, when constructed, be at all times operated in a manner satisfactory to the State Board of Health, and that it be enlarged when deemed necessary by said Board.

March 28, 1908, the president of the Methodist Home for the Aged at College Hill submitted samples of stone for the sprinkling filter, and of sand for use in the sand filters. There were examined and found to be satisfactory, and he was therefore notified that Condition 2, under which the plans were approved on January 9, had been complied with.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR COLLEGE HILL.

On February 15, 1908, a letter was received from Mr. J. C. Stewart, of Cincinnati, consulting engineer for College Hill, stating that plans had been prepared for sewerage and sewage purification for that village and requesting a visit to College Hill by a representative of the State Board of Health. The letter was accompanied by preliminary plans, a copy of the consulting engineer's report to the mayor and council which also embodied approximate estimates of cost, and general data required by the State Board of Health.

On February 21, 1908, one of the assistant engineers in company with the consulting engineer for the village visited College Hill and made a general inspection on the ground with reference both to the system of sewers and a suitable location for a sewage purification plant. During this visit certain general features relative to sewage purification were informally discussed with the consulting engineer.

In the early part of June, 1908, a set of plans for sewage purification was received and referred to the engineering department for examination. These plans were informally criticized in a letter from the secretary under date of June 8, 1908.

A second set of plans for sewage purification was submitted August 5, 1908, embodying most of the changes suggested in the letter of June

8th and also including a number of new features. After examination of these plans by the engineering department, they were informally criticized in a letter sent out by the secretary on August 14, 1908.

On October 15, 1908, the consulting engineer came to Columbus with a third set of revised plans which were informally discussed with one of the assistant engineers.

A fourth set of revised plans was submitted November 11, 1908. Owing to some criticism relative to the site chosen for the location of the purification works, it was deemed advisable for representatives of the State Board of Health to visit College Hill before the project was formally submitted to the Board. Accordingly, Dr. Stanton, president, and Mr. Hansen, assistant engineer, constituting a committee of the Board, visited College Hill November 17, 1908, and inspected the several sites available for the location of a purification plant in company with Dr. Sheets, president of the Cincinnati Sanitarium, whose property lay nearest the proposed site, and Mr. C. F. Nuzel, member of council, representing the interests of the village.

The following report on the entire project is submitted by the committee:

College Hill is a suburb of Cincinnati and lies about one mile to the northward of the northern corporation line of that city. The village is built upon a rather level table land on the highlands bordering the valley of Mill Creek. To the southward of the village and extending down into the Mill Creek valley are deep ravines with hilly slopes generally sparsely inhabited. The natural drainage of almost the entire area within the corporation limits of College Hill is toward one of these ravines which reaches nearly to the central part of the built-up portion of the village. This ravine is occupied by a small stream which, after flowing a distance of about two miles and a half, discharges into Mill Creek. The ravine has been taken advantage of for the location of an electric traction line which follows the general course of the stream.

The population of College Hill is estimated to be in the vicinity of 1,600. It is anticipated that the growth in the future will be fairly rapid and that the introduction of sewerage will give a considerable impetus to this growth, as the existence of an adequate system of sewerage forms one of the principal recommendations for the suburban towns about Cincinnati. In the way of public improvements the village now has a public water supply, well constructed sidewalks, and a number of well built macadam roads. The village in general presents a very picturesque and attractive appearance.

The public water supply above mentioned is taken from the Cincinnati water works and repumped for use in College Hill. Owing to the poor quality of the public supply until recently, cisterns and wells have been in general use for domestic purposes while the public supply has been used primarily in connection with indoor modern plumbing.

The extensive use of modern plumbing has made the need of an adequate system of sewerage strongly felt. At present wastes are cared for in cesspools of various constructions, many of which overflow into private drains which ultimately discharge into the small stream occupying the ravine above referred to.

PROPOSED SEWERAGE.

The proposed sewers are to be built upon the separate plan and will ultimately cover the entire village. The present construction involves only sanitary sewers, since it is expected that storm sewers will be constructed from time to time in the future wherever needed. The sanitary system is designed to ultimately meet the demands of a population of 10,000. For the present, however, it is believed that sewers covering about half the village will be all that are needed for the next five or ten years. The present installation includes the following lengths of pipe: 12-inch sewers, 2,000 feet; 10-inch sewers, 9,000 feet; 8-inch sewers, 12,000 feet. These sewers will be built according to most approved methods; that is, they will be of vitrified pipe laid with carefully cemented joints, will be provided with manholes at all changes of grade and direction (in no case more than 300 feet apart), and at all dead ends will be located flush tanks designed to discharge about 120 gallons per day each. Ventilation of the sewers will be effected by means of perforated manhole covers and vent pipes on house connections. The total cost of the entire project, exclusive of purification works, is estimated at $91,000, while the present installation will involve an expenditure of about $48,000.

SEWAGE PURIFICATION.

Owing to the inadequacy of the small stream occupying the ravine into which the sewerage of the village would naturally be drained for sufficiently diluting the sewage flow from the village to prevent nuisance, purification of the sewage is deemed necessary. In deciding upon the capacity that the present installation of purification works should have, it is considered satisfactory to make provisions for a tributary population of 2,000 which in all likelihood will not be exceeded within the next five to ten years.

The method of purification selected is essentially the same as that now in use by the city of Columbus, namely, screening, followed by preliminary sedimentation, followed by treatment on sprinkling filters, followed by a short period of sedimentation of the sprinkling filter effluent. There is one important addition, however, to the College Hill plant which consists of a filter bed for treating the sludge from the preliminary sedimentation tanks. Three considerations determined the selection of the method of purification, namely, as follows: 1. The availability of good stone on the site of the treatment works made it desirable to use some method in which broken stone is used as a filtering medium. 2. The small area required by a sprinkling filter plant as compared with other methods rendered this method especially adaptable to the available sites which have steep slopes and uneven surfaces. 3. The fact that the stream into which the final effluent is to be discharged is not used for any purpose requiring a water of a high degree of purity, renders a method applicable which will produce merely a non-putrescible effluent and not one reaching the highest degrees of purity obtainable in the art.

Location of Plant.—In the ravine below the sewer outlet there were two available sites for treatment works; namely, one just back of the grounds of the Cincinnati Sanitarium, which is submitted for approval, and the other at a point about 3,000 feet farther downstream. The latter of these sites is satisfactory in that it is far removed from any habitations, but is objectionable since in order to reach it the outfall sewer would have to be laid in rock excavation at very great expense, and moreover, the topography of the site does not lend itself so well to the construction of the plant as the sanitarium or first mentioned site. The sanitarium site, on the other hand, is easily reached by the outfall sewer and as already noted is better adapted for the construction of the works. It is deemed objectionable by some because it is located within a comparatively short distance of the sanitarium buildings. The main building of the sanitarium is 500 feet. distant, whereas the nearest inhabitated buildings other than barns and outbuildings are 300 feet distant from the site selected for purification works. It has been the general experience that under ordinary conditions, the odors from sewage purification works seldom travel a distance greater than 300 feet. In the present instance, the danger of odors reaching the sanitarium buildings is somewhat minimized by the fact that the prevailing winds would tend to carry the odors in the opposite direction; and furthermore, the works are to be so situated in the ravine that the neighboring hillsides will more or less prevent occasional winds blowing toward the sanitarium from carrying sewage odors with them. However, in order to prevent any possibility of disagreeable odors from the treatment works being disseminated throughout the neighborhood, it is proposed to cover all portions of the plant where sewage is exposed to the atmosphere.

Before entering into a detailed discussion of the various devices connected with the treatment works, it will be well to describe briefly the general arrangement. The plant occupies an area of about 210 feet by 65 feet and lies in such a position that its capacity may be increased in the future by additions on either side. The sewage enters the plant by gravity and is first received into one or both of two screen chambers, then passes through the preliminary sedimentation tanks having a capacity based on estimated capacity of the plant of twelve hours flow. The sewage from the sedimentation tanks flows into siphon chambers which are discharged at frequent intervals into what are termed equalizing chambers, and thence it flows on to the sprinkling filters. The effluent from the sprinkling filters is gathered into suitable channels and conveyed to the final sedimentation basins. A sludge bed is provided for receiving the discharge of the preliminary sedimentation basins when it is necessary to empty these for cleaning and removing sludge deposits.

SCREEN CHAMBERS.—There are two screen chambers, each 3 feet by 3 feet in plan and 2 feet 6 inches deep, inside dimensions. The inlet to each chamber from the main outfall sewer is 8 inches in diameter and has its invert at 12 inches above the bottom of the chamber. The outlet to the chamber is through an 8-inch opening, the invert of which is placed about 2 inches above the bottom of the chamber. Each chamber is provided with two screens placed at an angle of about 60 degrees to the horizontal and sloping backward from the incoming sewage. These screens are built up of wrought iron bars with circular section and ⅜-inch in diameter. The bars are placed vertically and with clear open spaces of ⅜-inch. The screens are readily accessible for cleaning and removal. It is anticipated that in actual operation one screen will be sufficient, the additional screen to be kept in reserve. Both inlet and outlet of the screen chamber are controlled by shear gates whereby the chamber can be entirely cut off.

PRELIMINARY SEDIMENTATION BASINS.—There are two preliminary sedimentation basins, each 45 feet long, 15 feet wide, having a total depth of 10 feet and a depth to the flow line of 7 feet 6 inches. The basins thus have each a capacity of 40,000 gallons, representing a flow period of twelve hours with both tanks in use and the works operating at rated capacity. The sewage is admitted to the tanks by distributing troughs extending across the inlet ends of the tanks and connected with the tanks by means of five 6-inch circular openings equidistantly spaced and each controlled by a shear gate. By means of proper adjustment of the shear gates, a very even distribution of the sewage across the width of the tank can be effected. The distributing channel is 12 inches wide and 12 inches deep to the flow line. The channels for the two tanks are separated by a small dividing wall provided with an 8-inch opening controlled by a shear gate. This arrangement permits of either or both tanks being used with either or both screen chambers. The distribution of the sewage across the width of each tank is still further insured by hanging baffles placed 2 feet in front of the inlets and extending to 3 feet below the surface of the liquid. The sewage is evenly drawn off in a similar manner from the tanks at the outlet ends, the design of which is an exact duplicate of the inlet ends. The collecting channel at the outlet end, which corresponds to the distributing channel at the inlet end of the tanks, discharges into the dosing chambers through openings 2 feet wide and 18 inches deep. These openings are provided with stop-planks whereby the level of the sewage in the screen chamber and sedimentation tanks may be controlled. At a point two-thirds the distance from the inlet end to the outlet end of the sedimentation tanks, is placed a pair of baffles, one being submerged and reaching to a height of 4 feet above the bottom of the tank and the other, placed about one foot beyond the submerged baffle, is a hanging baffle and reaches about 3 feet below the surface of the liquid. These baffles were placed for the purpose of intercepting floating and suspended sludge which is apt to be vomited up from the bottom of that portion of the tank near the inlet. The submerged baffle divides each tank into two compartments, each of which is provided with a sludge outlet placed at the bottom of a sump 6 inches deep and formed by evenly grading the whole bottom of the compartment. The sludge outlets are each 8 inches in diameter and connect with an 8-inch sludge discharge leading to the sludge bed. The sludge openings are controlled by quick opening 8-inch flap gates which can readily be controlled from the top of the tank. The sedimentation tanks are covered by a building which is designed to extend over the screen chambers already described and the dosing tanks and equalizing chambers described in the next paragraph. This building is a simple and very pleasing frame structure permitting free accessibility to all parts of the tanks, and is well lighted by windows placed on all sides. Over the dosing apparatus are placed syklights so that this mechanism may be readily inspected and repaired.

Dosing Tanks.—There are two dosing tanks, each 4 feet by 4 feet in plan with a total depth of 4 feet and a depth to the flow line of about 2 feet 6 inches; the capacity of each tank is thus 300 gallons. Based on the average rate of flow when the plant is operating up to its rated capacity, these tanks would fill once in every 5.4 minutes when both are in use or once in every 2.7 minutes when one is in use. In order to permit a free discharge of the siphons uninfluenced by the back pressure from the sprinkler nozzles, a so-called equalizing chamber is provided to receive the dose from the siphon chamber where it is allowed to flow out as rapidly as the sprinkler nozzle will permit. It is proposed to use the Merritt air lock siphons which so far as can be learned have given generally good satisfaction. The Merritt Company offers a special design for the equalizing chamber in combination with its device, which according to the plan would appear to be quite satisfactory in principle. This chamber should, however, be so proportioned that the bottom thereof will be from 2 to 2½ feet above the sprinkler nozzles.

Filter Bed.—The filter bed is rectangular in shape, 115 feet long and 60 feet wide. This gives an area of 6,900 square feet, or 0.158 acre. The filtering material will consist of broken stone such as will all pass a 2-inch ring and be retained by a ½-inch ring. The filtering material will form a bed 5 feet in thickness and will be graded from coarse at the bottom to fine at the top. The bed of filtering material will be supported upon a concrete floor 4 inches in thickness surrounded by a concrete wall which reaches to just above the elevation of the surface of the filtering material. The concrete floor has a ridge extending longitudinally along the center of the bed, which permits of drainage laterally to each side of the bed. The total slope of the floor on either side is 3 inches, or a grade of 1 in 90. The underdrains consist of 6-inch half tile 2 feet in length and provided with notches at the sides to permit of the ready entrance of the effluent. The design is very similar to the underdrains used at the Columbus plant, with the exception that one end of each tile is provided with a bell. This permits of some overlapping of adjacent drains with consequent less liability to clogging by material falling through the joints. The drains extend transversely of the bed and are laid 12 inches center to center. At both ends they discharge into concrete effluent gutters which extend along the sides of the filter. The underdrains are thus readily accessible for cleaning by flushing or other means. The sewage from the dosing tanks is conveyed to the filter through a system of cast iron pipe. A main pipe 10 inches in diameter leads from each equalizing chamber to a header, also 10 inches in diameter, which extends across the upper end of the filter bed just outside of the filter wall. Leading off from this header are five lines of 6-inch cast iron pipe extending longitudinally across the filter bed and at a depth of 12 inches below the surface. The laterals have a spacing center to center of 11 feet 3 inches. At intervals of 12 feet 6 inches, along the laterals are placed 3-inch pipe uprights which rise to a few inches above the surface of the filtering material. The tops of these uprights are threaded to receive the sprinkler nozzles. The spacing of sprinkler nozzles, as effected by the above described arrangement, brings these nozzles at the vertices of equilateral triangles into which the bed is thus divided. The spacing of the nozzles, assuming that the maximum spread of the spray would describe a circle 15 feet in diameter, is such as to cause the intersections of each three adjacent circles of maximum spray to meet in points. This arrangement will be made clear by a glance at the general plan of the filter bed (Plan B-568). The various laterals leading from the main header above mentioned are provided with valves at both ends. Those next the header will permit each lateral being used independently, and the valves at the lower end will permit of their being readily flushed out. The elevation of the orifices of the sprinkler nozzles is such that they will operate under a head of 7½ feet at the end of the discharge from a dosing tank, and will fall from this to zero. The equalizing chamber, as already noted, should be so arranged that practically the entire discharge will be affected at a head not less than 2 feet. As will be noted under the discussion of dosing tanks, a discharge when the plant is operating up to full capacity will be received at intervals of 2.7 minutes when one dosing tank is in use, and at intervals of 4.5 minutes when both dosing tanks are in use. It would, therefore, be well to have the nozzles so designed that they will deliver this discharge to the beds in about one half the time between the discharges of the dosing tank; that is, they should be capable of discharging 300 gallons in 1.35 minutes, or 600 gallons in 2.7 minutes. This arrangement would make allowance for the increased day flow when the total daily flow reaches the capacity of the plant; that is, the plant under maximum day load would be sprinkling practically continuously. It should be pointed out that it is not definitely known whether or not the sprinklers as shown on plan will permit of the operation of the filter in the manner described, or will effect the distribution which the spacing of the nozzles is designed to meet. To insure a proper relation between area covered and discharge the consulting engineer proposes to have a number of strainers carefully tested and thereby either obtain a pattern which will meet the conditions imposed by the present design of the distributing system, or a basis for rearranging the design of the distributing system so as to meet the performance of the nozzles.

To avoid the possibility of the dissemination of odors from the filter, it will be covered with a frame building substantially built and well lighted, and of a design to harmonize properly with the building over the preliminary sedimentation tanks.

FINAL SEDIMENTATION BASINS.—The effluent from the sprinkling filter is conveyed by means of the troughs already mentioned to the final sedimentation basins. There are two of these basins, each 10 feet wide and 59 feet 6 inches long at the water line and 4 feet 6 inches deep. Each basin has a capacity of 7,000 gallons, or there is a total capacity of 14,000 gallons. This represents a flow with plant operating at full capacity of a little over two hours. The effluent is admitted into one end of the basins from a distributing channel through four rectangular 8-inch openings equally distributed across the width of each basin. The effluent is drawn off from the opposite end over removable weirs extending the entire width of the basins. The flow from the weirs falls into a collecting trough of concrete and is thence discharged into a 12-inch pipe and conveyed to the creek. The basins are built entirely of concrete 6 inches in thickness. The sides of the basins are built on a slope of 1 to 1, excepting that the two basins are divided from each other by a central concrete dividing wall. Provision is made for cleaning the basins through 6-inch outlets leading to the nearby creek. The sediment which will accumulate in the basins will be entirely innocuous and may therefore be discharged into the creek without nuisance; but in order that unsightly deposits in the stream bed may not result, the basins should only be cleaned during high water in the creek.

SLUDGE BED.—The sludge bed is located at the lower end and to one side of the plant. This bed is simply an intermittent sewage sand filter having an area of 30 feet by 100 feet, or 3,000 square feet at the sand line. The area of the sludge bed is such that the contents of one of the sedimentation tanks will cover it to a depth of abour 1¾ feet. The filtering material consists of 3 to 3½ feet of coarse clean sand underlaid by broken stone. The sludge from the sedimentation tank is conveyed on to the bed by means of a wooden distributor trough arranged with adjustable side openings at 20-foot intervals. The effluent is carried off through three lines of 6-inch underdrain tile extending longitudinally under the sand bed.

FUTURE EXTENSION.—The proposed site for the sewage purification works will permit of future enlargement of the plant to twice its present capacity. It is believed that this is ample since it is quite probable that before the population of the village has increased to the point when a plant twice the size of that at present contemplated is unable to take care of the sewage of the village, the sewers will have been made tributary to the sewerage system of Cincinnati. Future extension of the present plant is very simple and merely involves a lateral building out of the present devices.

At a meeting of the State Board of Health, held December 10th, 1908, plans for a system of sewers for College Hill with sewage purification, presented by Mr. J. C. Stewart, consulting engineer, were approved, provided:

1. That the village employs a competent man to operate the plant in a manner satisfactory to the State Board of Health.

2. That before the construction of the plant is completed the consulting engineer submits to the State Board of Health final designs for the equalizing chambers and sprinkler system together with all experimental data on which the designs are based.

3. That the local authorities maintain permanent records of the exact location and method of construction of all connections that are made to the village sewers.

REPORT ON PROPOSED ENLARGEMENT OF THE SEWAGE PURIFICATION WORKS AT DELAWARE.

On March 7, 1908, there were submitted by Mr. J. S. Dyke, civil engineer acting for Delaware, in consultation with Messrs. E. G. Bradbury and Geo. P. Shute of Columbus, plans showing proposed changes and enlargement of the Delaware sewage purification works. These plans were examined by the chief engineer who made the following report.

The existing sewage purification works at Delaware were installed in 1903 and are described in the annual report of the State Board of Health Health for that year, on pages 485 and 486. A more detailed description of this plant together with a statement as to the results of the examinations and inspections by the State Board of Health is now in course of preparation and will soon be published in the special report on water and sewage purification investigations.

In brief, the present works, which are located on low land about one-half mile south of the edge of the city, consist of septic tanks and contact filters. The present tanks are two in number and have a combined capacity of 135,000 gallons. The contact beds are three in number and have an effective area of about 0.2 acre. They are filled with three feet of fine coke.

The operation of the plant, ever since its installation, has been more or less unsatisfactory. During the last year or two practically no purification has been effected other than that which has been accomplished by the septic tanks. The plant has several times been flooded by high water in the Olentangy River, and the filters covered with clay so as to prevent their operation. The automatic apparatus designed to control the operation of the filters has failed to do its work.

The secretary of the State Board of Health on October 22 sent the following letter to the president of the board of public service:

Mr. Richard Parsons, President Board of Public Service, Delaware, Ohio:

Dear Sir:—One of our assistant engineers recently made an inspection of your sewage disposal plant, and finds that it is in very bad condition on account of the neglect it has received in the past. No purification is being effected in the sewage after it passes through the septic tanks. The Olentangy River is, therefore, being polluted by the sewage of your city.

It appears that the city council some months ago passed a resolution ordering the Board of Public Service to engage a competent sanitary engineer to decide upon the proper method of placing the plant on a satisfactory basis. The Board should at once take steps toward carrying out the above resolution of the council.

Yours truly,

(Signed) C. O. Probst,
Secretary.

Proposed Plans.—As a result of the advice embodied in the above letter from the State Board of Health, it is proposed to change and enlarge the present works in accordance with the plans which are now submitted.

The new plans provide for works which will treat 600,000 to 800,000 gallons, or the sewage of not over 10,000 persons. This is ample future provision, as less than 4,000 persons use the sewers and the present flow of sewage is about 400,000 gallons per day. The sewage is weak in character and is not complicated by manufacturing wastes.

The present septic tanks will be remodeled so as to form three tanks of about 35,000 gallons capacity each. Adjoining these on the west will be constructed two new tanks of 50,000 gallons capacity each. These tanks will be called settling tanks.

The effluent from the settling tanks is to flow into a pump well 20 by 7½ feet by 6 feet deep, from which it will be raised by centrifugal pumps operated by an electric motor, into an "equalizing" basin. The motor will be started automatically by means of a float when the pump well is full.

The equalizing basin is approximately 40 feet square and 6 feet deep. The bottom of this basin is about a foot above the top of the filters. The sewage is drawn off from the basin through a specially designed system of four float valves, each valve controlling the discharge upon one-half of a filter. The floats can be so adjusted that the valves may be brought into operation in whichever order desired.

A sludge bed to receive the sludge from the settling tanks is to be installed. This bed will be about 50 feet square and is to be filled with three feet of cinders. The sludge from the bottom of the settling tanks is to be pumped by means of a movable rotary pump driven by electricity. It is stated that the tanks will be cleaned about once a month.

The three contact filters of the present plant will be abandoned, and in place of two of them there will be constructed sprinkling filters composed of broken stone three to five feet deep. Each of these sprinkling filters will be 100 feet square, this giving a total area of about one-half acre. Based on the nominal capacity of the plant, the rate of treatment per acre will be about 1,500,000 gallons per day. The sprinkling filters are to be built upon the outside by rough masonry. The underdrains will extend through the filters, and the effluent will be discharged in the channels running along the outside.

These plans were amended March 31, 1908, by the addition of a sedimentation basin of 50,000 gallons capacity to receive the effluent from the sprinkling filters.

The works are to be surrounded by an embankment of ample size to protect them against freshets. The outlet to the river will be equipped with a flap gate.

April 3, 1908, these plans for the enlargement of the sewage disposal works, as shown on drawings submitted March 7, 1908, and amended March 31, 1908, were approved provided the management and operation of the plant be at all times satisfactory to the State Board of Health.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR FREMONT.

At the meeting of the State Board of Health, held at Dayton on October 20, 1908, a plan was presented by Mr. C. O. Lasley, city engineer of Fremont, for additional sewerage for that city. This plan was referred to a committee consisting of Dr. Chapman and the chief engineer. The committee visited Fremont on November 6, 1908, and in company with the city engineer inspected the territory in question. At that time additional information was requested of the city engineer, which information was received on November 27, 1908. The committee begs to submit the following report:

Fremont has a population of about 9,000 and is located on the Sandusky River in Sandusky County.

There are about twenty miles of sewers with four principal outlets into the Sandusky River at various points as shown on plans on file with the State Board of Health. About 75 per cent of the population has access to the sewers, but considerably less than this number actually uses them.

All of the existing sewers are on the combined plan and receive both house drainage and storm water. When the river is at its normal elevation, no nuisance is created, but when the river is low, which condition is caused at times by strong southwest winds, the river bed is exposed and the sewage causes offensive conditions in the vicinity of the outlets.

PROPOSED SEWER FOR EAST SIDE.—It is proposed to construct a new combined sewer to drain the territory covering about 40 acres in the easterly portion of the city. The total population in this district, based on actual count of the houses, is estimated at 1,100. The sizes and lengths of sewers are as follows: 30-inch, 1,175 feet; 24-inch, 830 feet; 18-inch, 405 feet; 12-inch, 1,655 feet.

The outlet of the proposed sewer is to be located at the foot of Chestnut Street at the same point as an old outlet. In addition, there is to be a relief overflow into the river just below Fuller Street.

On a basis of 75 gallons per capita, there will be a dry weather flow in the proposed sewer of 70,000 gallons per day. The sewer is designed to discharge 10,000,000 gallons of storm water at the lower outlet; and the relief outlet, which will operate only when the rate of flow in the main sewer is 1,000,000 gallons, is designed to discharge 7,500,000 gallons per day. The estimated cost of the proposed sewer is $18,000.

In view of the fact that the city is almost entirely sewered on the combined plan, there would be little advantage in insisting upon a separate sewer for this new district.

PROPOSED STORM WATER SEWER.—It is proposed to build a relief sewer in the central portion of the city on the west side of the river, to discharge near the foot of Garrison Street. This sewer is to relieve the existing Front Street sewer which is 24 and 30 inches in diameter and is not capable of taking care of all storm flows. This Front Street sewer above the point of intersection of the proposed relief sewer is said to have a small dry weather flow, the depth of flow being only 3 inches. The overflow through the proposed relief sewer will not take place until the Front Street sewer is half full. The dilution, therefore, will be very great.

At a meeting of the State Board of Health, held December 10th, 1908, plans for a sewer on the east side of Fremont to discharge into the Sandusky River at the foot of Chestnut Street, as submitted by Mr. C. O. Lasley, city engineer, on October 20th, 1908, were approved. provided, that the outlet, together with the outlet of the existing sewer at that point, be caused to discharge into deep water.

The Board further considered a plan for a relief sewer to intercept the storm flow in Front Street sewer and to discharge at a point just above Garrison Street, as shown on above mentioned plan, and said plan was approved.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR GALION.

On July 9, 1908, plans for proposed sewerage and sewage purification for Galion were received from Messrs. Bradbury and Shute, consulting engineers for the city. As the local conditions were well known to the engineering department, no inspection on the ground was necessary. The plans were referred to the chief engineer who submitted the following report:

Galion is a city of about 9,000 inhabitants, located in the south-eastern corner of Crawford County on the watershed of the Olentangy River, locally known as Whetstone Creek.

Some twenty-five years ago, a general plan for a sewerage system was drawn up by the late Colonel George E. Waring, Jr., but this plan was carried out to only a slight extent, there being but one sewer district at the present time. The city has not over three miles of sewers.

PAST ACTIONS OF THE STATE BOARD OF HEALTH.—In 1895 the secretary of the State Board of Health made an investigation of the pollution of Pickle Run, a small tributary of Whetstone Creek, and found that a most offensive nuisance was then being created by the discharge of sewage into this run and that the health of a large number of people was being endangered. It was then suggested that the nuisance be abated by providing proper sewerage and sewage disposal for the city.

In 1897 the board of sewerage commissioners of Galion presented plans to the State Board of Health, showing a proposed line of sewers and outlet. These plans were referred back to the commissioners with the request that they be revised and plans for sewage purification be included. As the cost of such purification was then considered to be somewhat great, nothing further was done at that time.

In 1902, Mr. John P. Force, consulting engineer, submitted general plans for sewerage and sewage purification. These plans provided for septic tanks and contact filters and were approved by the State Board of Health. The plans, however, were never carried out.

On August 1, 1906, the chief engineer of the Board visited Galion and made an investigation of its sanitary conditions with respect to the necessity for sewerage. The conclusions of his report are as follows:

> 1st. From the present, and also from past investigations made by the State Board of Health during the last ten years, it has been found that the sanitary condition of Galion as regards the disposal of its sewage and other waste matters, is most disgraceful, and is a constant source of danger to the health of the inhabitants.
>
> 2nd. Probably a large amount of sickness, and certainly much discomfort, has been caused in Galion during the past ten years, which could easily have been prevented at moderate expense.
>
> 3rd. The city council should at once take steps toward procuring detailed plans and specifications for a sewerage system and a sewage disposal plant, satisfactory to the State Board of Health, and then take steps toward raising necessary funds to pay for their installation.

PROPOSED PLANS.—The sewerage system is designed for an ultimate population of 40,000, although not more than 2,000 will use the sewers in the immediate future. It consists of a total length of 124,000 feet of sanitary sewers and 24,300 feet of storm sewers. The intercepting sewer, about 15,000 feet long, is to be 24 inches in diameter at its lower end. All of the sewers, with the exception of those in District No. 2, are to be underdrained and the cellar drains are to connect with these underdrains. The sewers are to be flushed by hand and ventilated through manhole covers

The estimated cost of the entire work is $99,770, of which the interceptor will cost $26,300, the disposal plant $30,600, and the storm sewers $35,800.

The proposed plans provide (as did the plans which have already been approved) for tanks, now called sedimentation tanks, and contact filters. The plant is designed to care for 600,000 gallons of sewage, which is sufficient capacity for ten or fifteen years. The plant can then readily be duplicated.

The site chosen for the disposal works is located on the westerly bank of Whetstone Creek well below the city. There are no houses within one-fourth of a mile of the plant, although there are two within a little greater distance than this. The location, although perhaps somewhat lower than could be desired, is suitable for the purpose and the plant as designed can operate at all stages of the creek. The area of land to be purchased has not yet been decided upon.

The sewage on arriving at the plant first passes into a screen chamber and through a wrought iron screen having an open space of one inch. The screen chamber forms a part of the sedimentation tanks which will measure 69 feet by 41 feet over all. These are divided into three units, each 21 feet by 41 feet and holding 50,000 gallons based on an estimated capacity for the plant of 600,000 gallons. This will give a six hour period of sedimentation. The tanks are thoroughly baffled and so arranged that the sewage may be passed through them in tandem or in parallel. The sewage is introduced and drawn off through outlets near the top, but protected by baffles extending two feet below the surface.

Provision has been made for draining the sludge from the bottom of these tanks to a central sludge chamber from which it will be pumped by means of a submerged vertical centrifugal pump driven by a gasoline engine to a sludge bed near the tanks, having an area of 5,040 square feet. The sludge bed is to be filled with about two feet of sand or other suitable material.

From the sedimentation tanks the effluent will pass to a central controlling and regulating chamber which will control the flow on to and from the contact filters. The type of apparatus has not yet been decided upon and the details of the chamber have, therefore, not been drawn.

The contact filters are five in number and each has an area of one-fifth acre, making a total area of one acre. The filters are of irregular outline in order to fit the topography of the ground. The upper ends of all of them, however, are immediately adjacent to the proposed controlling chamber. The filters are to have an average depth of 5 feet and are to be filled with locomotive cinders properly crushed and screened. The rate per acre per day will be 600,000 gallons, and the population per acre-foot will be about 1,200 when the plant has reached its capacity.

July 20th, 1908, the State Board of Health approved the plans for proposed sewerage and sewage purification for the city of Galion, as shown on drawings submitted July 9th, by Messrs. Bradbury and Shute, consulting engineers, provided:

1st. That the purification works be constructed before any of the new sewers are placed in use;

2nd. That detailed drawings of the controlling chamber and devices be submitted to the State Board of Health for approval as soon as such apparatus has been chosen; and,

3rd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR HARTWELL.

On March 13, 1908, plans for sewerage and sewage purification for the village of Hartwell were submitted by The Riggs and Sherman Company of Toledo, consulting engineers. The assistant engineer visited

Hartwell on March 24, 1908, and in company with one of the consulting engineers made an inspection of the territory in question. The plans were examined by the engineering department and the following report was submitted:

Hartwell is a village of approximately 2,000 population, located about five miles to the northward of the corporation limit of Cincinnati and in the valley of Mill Creek. It is a suburban residential town of the city of Cincinnati and contains practically no industries. It lies to the southward of the neighboring towns of Wyoming and Lockland. Hartwell is situated on the low land bordering Mill Creek, the maximum elevation within the village limits being about 25 feet above the creek level. The area of the village is about 350 acres. There are about 8 miles of streets, as follows: 1½ miles of macadam streets with concrete curb and gutter; 5 miles of macadam and gravel streets without curb and gutter; and 1½ miles of gravel and dirt roads.

Hartwell is provided with a public water supply which is taken from the water works of the neighboring town of Wyoming. Owing to the presence of a water supply and the general tendency of the population to install modern plumbing, there has been greatly felt the need of a well constructed and adequate system of sanitary sewers. The only sewers that have been built up to the present time are about 2½ miles of storm sewers, many of which are being used for sanitary purposes. These sewers discharge into Mill Creek at the most convenient points, and the outlets are in some cases very poorly constructed. Aside from the offensive conditions adjacent to some of these outlets, Mill Creek is at this point fairly clear in appearance, though it receives large amounts of contamination (principally manufacturing wastes) from the villages of Wyoming and Lockland. The flow of the stream at this point is not known, but a rough estimate based on a mere observation of the stream would place the flow during medium low stage at perhaps ten million gallons per twenty-four hours. Below the point of proposed discharge, the stream becomes more and more polluted along its entire course, until when it passes through the city of Cincinnati it is little better than an open sewer.

Proposed Plans.—The main trunk sewer will be perhaps 1,400 feet in length, 18 inches in diameter, and will extend parallel with the right of way of the C. H. & D. Railroad in a southerly direction. Owing to the slight available fall, it will be necessary to lay the main outfall on the minimum grade consistent with a self-cleansing velocity. The ultimate quantity of sewage which this outfall is expected to carry is about 700,000 gallons per twenty-four hours.

The sewage from Hartwell will be entirely of domestic origin, with some cellar drainage. No manufacturing concerns will connect with the sewerage system. It is expected that the population which will use the sewers immediately after their completion will be about 1,000, and the ultimate population for which the sewers are planned is about 3,000. The quantity of sewage expected in the beginning will be about 80,000 gallons, which figure is derived by assuming a sewage flow of 80 gallons per capita. It is expected that the connections immediately made will be about 200 in number and mostly one-family houses.

The sewage will be purified by intermittent sand filtration preceded by treatment in septic tanks. The effluent will be discharged into Mill Creek near the C. H. & D. Railroad crossing. The site proposed for the purification plant is especially adaptable to the purpose, inasmuch as it is located in a broad expanse of level bottom land too poor in quality for farming purposes and owing to its slight elevation above the creek not likely ever to be used extensively for building purposes. The nearest houses which may be affected by odors from the plant are probably fully 1,000 feet distant. The only purpose to which the land in the vicinity of the proposed plant will be put is for the location of manufactories. Owing to the small available fall, it will be necessary to pump the sewage to an average height of about 20 feet. For this purpose there will be located at the site of the purification works a small automatically operated pumping station. The pumping machinery will consist of a vertical centrifugal pump taking its suction near the bottom of the collecting or pump well which will have a capacity of about 7,500 gallons. The pump itself will be placed just below the maximum elevation of sewage in the pump well, so that when it is started it will be primed. The pump will be driven by means of a three horse power electric motor placed on a floor just above ground level. The automatic starting device will be operated by means of a float placed in the pump well, and will be so adjusted that when the sewage rises to the level of the invert of the outfall sewer, the motor will begin to operate. The sewage before passing into the pump well will pass through a screening chamber which consists of a rectangular frame covered on three sides and the bottom with copper wire screen. The screen chamber will be 3 feet 6 inches wide, 4 feet and 6 inches long, and four feet deep. The wire will be No. 10 gage woven into a 1-inch mesh. Arrangement is made for lifting the entire screen chamber out of the pump well above the level of the pump room floor where it may be cleaned.

The sewage from the discharge of the pump will enter directly the septic tanks which are two in number. Unconditional approval should not be given to the septic tanks, as there are several details relative to their construction which might be effectively altered.

From the septic tanks the sewage will flow by gravity to the dosing chamber. Previous, however, to the construction of the tanks, the flow will take place directly from the pump discharge into a conduit leading to the dosing chamber. It is proposed to place in the dosing chamber automatic apparatus which will discharge in rotation upon the four sand filters. The type of apparatus to be used at this point has not yet been decided upon.

The total area of the sand filters at present proposed is ¾ acre, which, based on a population connected to the sewers of 1,000, would mean 1,333 persons per acre. The beds are to be 3 feet in depth. The filtering material to be used has not been selected, so that no information relative thereto is available. It appears from the drawings that the underdrains, which will be of 6-inch tile, are laid about 15 feet apart, which would seem to be a liberal provision. They all unite in a common drain passing underneath the center of the plant and thence to the creek. The distributing troughs are of ingenious design and made of galvanized iron sheet metal. They are provided with a large number of adjustable openings which permit the sewage to fall upon the beds at a great number of points. Attention should be called, however, to the great height (12 inches) of the distributing troughs above the sand near their upper end. At such points small slabs of stone should be so placed as to break the force of the fall of the sewage on to the surface of the filtering material.

April 3, 1908, the Board approved these plans for sewerage and sewage purification for Hartwell, as shown on drawings submitted March 13,1908, provided:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use;

2nd. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters, and that the proper thickness of each grade of material be determined by the State Board of Health when the quality of the material is examined;

3rd. That detailed drawings showing the plant as it will be when completed and ready for operation, including the controlling apparatus, be submitted to and receive the approval of the State Board of Health before being finally approved; and,

4th. That the management and operation of the plant be at all times satisfactory to the State Board of Health, and that the plant be enlarged when deemed necessary by said Board.

The Board also, on the above date, approved the scheme of omitting the construction of the septic tanks for the present; more detailed drawings to be submitted before the tanks are constructed.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR COURT HOUSE AND JAIL AT JEFFERSON.

On September 3, 1908, Mr. J. S. Matson, county engineer of Ashtabula County, presented plans for sewerage and sewage purification for the court house and jail at Jefferson. These plans were reviewed and informally commented upon by the engineering department. On September 12, 1908, revised plans were submitted, but as these were not altogether satisfactory in several important details, a second revision of the plans was requested. Plans embodying this second revision were received October 3, 1908, and were reported upon as follows:

The Ashtabula County court house and jail are on a lot near the center of the village of Jefferson, the county seat. It is proposed to provide these buildings with sewerage for sanitary purposes. The average number of persons, including prisoners and attendants, in the jail is 35. The number of regular employees in the court house is 30. During sessions of the court, there are of course a large number of other persons about the court house.

The sewage from the buildings will be conveyed through an 8-inch vitrified sewer pipe laid with cemented joints, a distance of 2,424 feet to a suitable site for purification works on the bank of a small tributary of Mill Creek. It may be noted that this tributary enters Mill Creek well below the water works intake. It was stated that special precautions will be taken to prevent tapping of the sewer for nearby residences or buildings of any description other than the jail and court house. The site selected for the purification works is about 700 feet distant from the nearest house, and it was stated that the land in the vicinity is not at any time likely to be used for building purposes.

The purification works are designed to care for the sewage of 100 persons, which would seem to be a fairly liberal allowance. The quantity of sewage is estimated by assuming a flow of 50 gallons per capita per day, thus giving a total of 5,000 gallons per twenty-four hours. In view of the local conditions, this estimate seems to be ample and may also be taken to include about 400 gallons per day discharged from a flush tank to be placed at the upper end of the sewer line.

The purification works, as shown on revised plans, comprise a screen chamber, settling tank, dosing chamber, sludge bed, and three intermittent sand filters.

SCREEN CHAMBER.—The screen chamber is placed at the sewer outfall and adjacent to the inlet end of the settling tank. As shown on plans, it is 3 feet long in the direction of flow, 2 feet wide, and 6 inches deep below the invert of the entering sewer. It is provided with a screen composed of ¾-inch by 1-inch iron bars placed vertically and spaced ¾-inch center to center. The screen is set at an angle of about 30 degrees with the vertical and is inclined toward the incoming sewage, thus causing an upward flow through it. This is not the customary way of placing screens, but under the circumstances would seem an advantageous arrangement inasmuch as it tends to prevent rapid clogging, thus necessitating less frequent cleaning.

SEDIMENTATION TANK.—The sedimentation tank is 14 feet long, 4 feet wide, and 6 feet 4 inches deep to the flow line. These dimensions represent a capacity of about 2,500 gallons, or about twelve hours flow, an ample allowance. An even distribution of the flow of sewage across the width of the tank is obtained by placing hanging baffles 6 inches in front of the inlet and outlet. For the purpose of preventing vomiting of sludge near the outlet of the tank and thus preventing solid matter from finding its way into the dosing chamber, a hanging and a submerged baffle are placed two-thirds the length of the tank from the inlet end. The submerged baffle divides the lower portion of the tank into two compartments, in the center of the bottom of each of which is placed a sludge valve.

DOSING TANK.—The dosing tank has the same dimensions and hence the same capacity as the sedimentation tank. It is of such size that one dose discharged on to a filter will cover it to a depth of 1⅝ inches. The type of dosing apparatus has not yet been selected. Such apparatus should be capable of discharging automatically alternately on any two filters.

SUPERSTRUCTURE.—Both the settling tank and dosing chamber, which as shown on the plans are adjacent to each other, are covered with a superstructure well lighted by four windows. The superstructure while permitting easy accessibility to all parts of the sedimentation tank, dosing chamber, and dosing apparatus, prevents the dissemination of disagreeable odors and screens from view the unsightly appearance of the sewage.

FILTERS.—Three sand filters are provided, each 66⅓ feet long by 40 feet wide at the sand line; the total area is thus 8,000 square feet or 0.184 acre, which will easily take care of the sewage of 100 persons. The filters are made partly in excavation and partly in embankment. The embankments are to be placed in layers and well compacted, and those portions above the sand line are to be sodded to prevent the material of which they are composed being washed out upon the surface of the beds.

The filtering material consists of 4 feet of sand underlaid by a layer of gravel which varies in thickness from 2 inches midway between the underdrains to one foot directly over the underdrains. A sample of the sand has been submitted. It is a clean coarse lake sand and seems in every way to be satisfactory for the purpose. No sample of the gravel has been received, but it is understood that this is to be a clean lake gravel graded from coarse at the bottom to fine at the top in such manner as to prevent sand from finding its way through the interstices to the underdrains.

Each filter bed is provided with one main underdrain which has six tributary laterals. The main underdrains are 6 inches in diameter and the laterals 4 inches in diameter. The main underdrains unite in a common manhole from which the effluent is conveyed through an 8-inch vitrified sewer pipe outfall into the small branch of Mill Creek. To assist ventilation of the filter beds, a vertical ventilator is provided at the end of each of the laterals.

The sewage is distributed upon the sand bed by means of a system of wooden distributing troughs. Provision is made for discharging the sewage at about six points equally spaced upon the surface of the sand bed. At each point where the sewage is discharged, there is a small stone or concrete slabs for the purpose of protecting the sand against injurious erosion.

SLUDGE BED.—A sludge bed is provided 16 feet wide and 30 feet long at the sand line, thus giving an area of 480 square feet. This area is sufficient to receive the entire contents of the settling tank, with a ponding of about 9 inches in depth. The sludge bed is made entirely in excavation. The slopes above the sand line, as in the filters, will be sodded.

The filtering material is to consist of a 4-foot layer of coarse lake sand similar to that submitted as filtering material for the sand filters. This will be underlaid by gravel ranging in thickness from 2 inches at the sides of the bed to 12 inches over the underdrains. The bed will be underdrained by one 4-inch tile passing longitudinally through the center of the bottom. Partial distribution of the sludge over the surface of the bed is effected by troughs leading to the center of the bed and there discharging on to a concrete slab.

At a meeting of the State Board of Health, held October 20th, 1908, plans for a proposed sewerage system and sewage purification for the court house and jail at Jefferson, as shown on drawings submitted by Mr. J. S. Matson, county engineer of Ashtabula County, were approved.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR KENT.

On December 12, 1907, there were submitted by Messrs. Chapin and Knowles of Canton, consulting engineers for the village of Kent, plans for sewerage and sewage purification for that village. In anticipation of these plans being submitted, the chief engineer visited Kent on October 23, 1907, and made the necessary investigation relative to the proposed project. The plans were examined by the engineering department, and the following report was made:

The village of Kent, having a population of approximately 4,500, is located in Portage County on the Cuyahoga River. The village covers an area of about two square miles. The next town below Kent, on the river, is Cuyahoga Falls, some seven miles distant. No municipality derives a public water supply from the river direct, although the river water is claimed to have some effect at times upon the quality of the Cleveland water supply.

The present drainage of the village of Kent passes into the river through surface gutters and two short sewers, there being as yet no public sewers for domestic purposes. In addition, railroad shops, file works, and a condensed milk factory discharge their sewage and wastes into the river. The need for a general sewer system is very apparent.

At a meeting of the State Board of Health on January 16, 1901, it was voted to grant permission to the village of Kent to construct sewers and discharge sewage into the Cuyahoga River, provided satisfactory plans for sewerage and sewage purification works be filed in the office of the Board and that the purification works be constructed when considered necessary. Since that time few, if any, sewers have been built and no general plan has been adopted previous to the one which is now presented to the Board. It would seem in view of the increased population of Kent since the last action of the Board and in view of the progress in the art of sewage purification, that the matter might be viewed from a different standpoint at the present time and that purification works be required as part of the proposed sewerage improvements.

The sewerage system proposed will consist of about twenty miles of sewers from 8 to 12 inches in diameter. It is proposed to construct two main sewers, 10 to 12 inches in diameter, to carry domestic sewage only; one through the northerly portion of the corporation and one through the southerly portion to a tract of land covering about seven acres, located along the Cuyahoga River just below the Wheeling and Lake Erie Railroad bridge. The main sewer from the southerly district passes underneath the Cuyahoga River by means of an inverted siphon. The site chosen for sewage purification is well adapted for that purpose, there being no houses within several hundred feet and but few within half a mile.

The method of sewage purification proposed consists of septic tanks and sprinkling filters, with provision for sand filtration in the future, if considered necessary. It is estimated, on the basis of 80 gallons per capita and on a future population of 7,500, that not more than 600,000 gallons of sewage will be produced. The purification plans have been designed, therefore, on this basis.

The two main sewers will discharge into a screen chamber 8 feet square, interior dimensions. From this chamber the sewage is to pass into one or both of the septic tanks, each of which is 35 feet by 55 feet in plan with an average depth of 9 feet 3 inches. The tanks together have a total storage capacity of 260,000 gallons, or about six hours' flow based on the ultimate yield of sewage. Each tank has a longitudinal baffle wall which causes the sewage to pass through a distance equal approximately to twice the length of the tank, thus increasing the velocity and causing better distribution of the sludge. The tanks are to be uncovered, although they are so designed that they can be easily covêred later if desired. Provisions are made for readily draining the bottoms of the tanks when necessary.

The effluent from the septic tanks passes through two 18-inch weirs into a dosing tank 20 feet square and designed to operate when the depth reaches about four feet, thus giving a dose of not more than 11,000 gallons at each discharge.

The sprinkling filters are located about 100 feet west of the septic tanks and 2 feet below the bottom of the dosing tank, from which they receive the sewage through a 12-inch iron pipe. These filters are two in number, each 60 feet wide and 100 feet long, and are to be filled with broken stone to an average depth of five feet. The filtering material has not yet been decided upon.

The sewage is to be distributed over each filter by an 8-inch main running longitudinally through the center and resting on iron standards or footpieces at an elevation of about two feet from the bottom of the filter. From this main, every ten feet, extend lateral distributors. Galvanized iron risers with sprinkling nozzles are to be inserted in these lateral distributors every ten feet.

The bottoms of the filters are graded into alternate ridges and valleys, the valleys, which are shaped into drains, being ten feet apart. The drains in these valleys are to be covered with ordinary brick with 1.5-inch spaces between them, and the entire bottom of the filter is to be covered with brick so placed as to provide channels about 1.5 inch wide leading to each drain. On this brick will be placed the filtering material.

Based on a capacity of 600,000 gallons per day, the filters will ultimately be operated at a rate of about 2,000,000 gallons per acre per day. The actual rate of application of the sewage will be governed to a considerable extent by the design of the nozzles to be used, and this has not yet been decided upon.

The effluent from the filters will pass into a final sedimentation basin 50 feet by 70 feet with an average depth of 2.2 feet and holding, based on ultimate capacity of the plant, about two hours' flow.

There has been shown on plans, for future installation when necessary, a sand filter 150 feet square, having an area of about one-half acre.

At a meeting of the State Board of Health held January 22, 1908, these plans for sewage purification plant for Kent, as shown on drawings submitted by Messrs. Chapin and Knowles, December 12, 1907, were approved upon the following conditions:

1st. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That detailed plans of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health before these are installed;

3rd. That an area of sand filters, as shown on plans, be constructed whenever deemed necessary in the future by the State Board of Health;

4th. That the sewage purification works, as shown on plans now submitted, be constructed before any of the proposed new sewers are placed in service; and,

5th. That the operation and management of the plant be at all times satisfactory to the State Board of Health.

REPORT ON PROPOSED STORM WATER SEWER FOR LANCASTER.

On September 2, 1908, application was made by Mr. John N. Wolf, city engineer of Lancaster, for approval by the State Board of Health of a storm water sewer to be built primarily for the purpose of effecting cellar drainage. Additional information was requested, and on September 11, 1908, plan of the proposed sewer was received together with a regular State Board of Health form for proposed sewerage properly filled out. One of the engineering assistants visited Lancaster on November 23, 1908, for the purpose of making an examination on the ground. The following report of the engineering department was submitted:

The territory through which the proposed sewer is to pass lies in the southern part of the village on the south bank of the Hocking River and on both sides of the road (known as Broad Street) leading to the Boys' Industrial School. The land is low and subject to inundation during periods of freshet in the Hocking River.

In the cellars of a number of dwellings which have been built on the east side of Broad Street, water stands to a depth of 2 or 3 feet during a large part of the year. It is for the purpose of draining these cellars that the proposed sewer is to be built. There are at present ten or a dozen dwellings, all frame structures and of the poorer sort. While the public water supply is available in this vicinity, it has not been introduced into any of the dwellings and, owing to expense, is not likely to be introduced in the future. The occupants still depend upon private dug wells or cisterns for their water supply and all the dwellings have outdoor privies.

The sewer as contemplated is to be built of vitrified pipe with tightly cemented joints. It is to have a total length of 2,782 feet, of which 1,186 feet will be of 6-inch pipe laid on a 0.5 per cent grade and 1,596 feet of 8-inch pipe laid on a 0.25 per cent grade. The sewer will have an outlet into the Hocking River near the Broad Street bridge, if permission can be secured for crossing land in this vicinity. Should such permission not be granted, the sewer will be carried over adjoining land and discharged into the Hocking River some distance to the eastward.

It is anticipated that ten houses will connect with the sewer as soon as same has been completed, and it is not anticipated that more than 20 houses will be connected at any time in the future. The sewer is to be used exclusively for cellar drainage, and it is not likely that it will be used for carrying off sanitary wastes even surreptitiously, since high water in the Hocking River will carry these wastes back into the cellars. It is very probable, however, that some of the cellar drainage will consist of soapy wastes from the laundry and possibly kitchen sinks. Such wastes would cause odors from the sewer to enter the cellars, but would probably not create a nuisance at the outlet of the sewer since the ordinary flow of the Hocking River is capable of taking care of the wastes. It should be noted, however, that the Hocking River is receiving sewage and other putrescible wastes from the various other sewer outlets in the city, and it may not be good policy to permit the entrance of any more. The difficulty could be overcome, perhaps, by requiring that cellars be drained by cutting off the flow of ground water toward the cellars at the outside of the cellar walls. This may be accomplished by placing drain tile around the foundation walls of the buildings somewhat below the floor level of the cellars, and surrounding these drains by gravel or broken stone. The drains may then be connected with the proposed sewer. Owing to the cheap character of the houses, this properly done would in all probability not prove practicable.

At a meeting of the State Board of Health, held December 10th, 1908, the plans for a storm water sewer in the southern part of the city of Lancaster, as shown on plans submitted by Mr. John N. Wolf, City Engineer, on September 11th, 1908, were approved, provided, that an ordinance be passed by council forbidding the tapping of the proposed sewer or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind; and that a certified copy of said ordinance be filed with the State Board of Health.

REPORT ON PROPOSED SEWERAGE FOR LOWELLVILLE.

On April 29, 1908, a preliminary plan showing tentative scheme for sewerage for Lowellville was submitted by Eugene Kirk and H. M. Reel of Youngstown, consulting engineers. The chief engineer visited Lowellville on May 4, 1908, to make the necessary inspection, during which time the relative advantages of a separate system over a combined system were discussed with the consulting engineers. The plans were revised and were resubmitted on June 9, 1908. These plans were examined by the chief engineer, who reported as follows:

Lowellville is a village of about 2,000 population, located on the Mahoning River in the northeastern part of Mahoning County about ten miles below Youngstown. The village is within a mile of the Pennsylvania state boundary line. The streets are unpaved. There are few industries in the town, but a number of the inhabitants are employed in steel plants at Struthers and Youngstown. The village is not growing rapidly.

At present there are three storm sewers, built by the village and one of the railroad companies, which discharge into the Mahoning River at Nessle Street, Third Street, and Sixth Street; all of these sewers are on the northeasterly side of the river. In addition there is one 24-inch storm sewer at Washington Street, on the southerly side of the river.

The proposed plans contemplate an entirely separate or double system of sewers, one for storm water drainage and one for domestic wastes.

The domestic sewers have a total length of about four miles and provide for the sewage of 6,000 people based on a discharge of 100 gallons per capita per day, with the sewers running half full. Only a small amount of roof water at the upper end of each lateral will be admitted to this system. These sewers will be ventilated through the soil pipes in the residences connected. The main outlet to the sanitary system on the northerly side will be through a 12-inch pipe discharging near the southerly corporation line at Sixth Street; and on the southerly side through a 10-inch pipe discharging about 500 feet below the dam.

The storm water system as designed is to care for a rainfall of one inch per hour and the delivery of 0.7 cubic foot per second per acre. The plan contemplates the use of the existing sewers for storm water purposes. The main outlets on the northerly side of the river will be, first, at a point opposite Watson Street; second, at Nessle Street; third, at Third Street; and fourth, at Sixth Street. On the southerly side of the river the outlets will be at Washington Street and at a point 500 feet below the dam.

Although plans for the entire village have been prepared, it is not expected to construct many sewers at the present time. In fact, it will probably be many years before the entire system is carried out. It is desired, however, to construct all sewers to the best ultimate advantage; hence, the preparation of the present complete plans.

The Mahoning River above Lowellville is badly polluted by the sewage of Youngstown and to a certain extent by that of Struthers. At the latter place, which is three miles above Lowellville, the Board recently approved plans for a new sewerage system and outlet "with the understanding that the village shall be called upon to install a sewage purification plant of a design satisfactory to the State Board of Health whenever this is deemed necessary by said Board."

Below Lowellville the Mahoning River soon passes into Pennsylvania and together with the Shenango River forms the Beaver River. It may be of interest to mention that the Pennsylvania state health department has ordered towns along these streams and their tributaries, which are not far from the Ohio line, to purify their sewage within a definite time.

At a meeting of the State Board of Health, held June 17, 1908, the plans for sewerage for the village of Lowellville, as shown on drawings submitted by Mr. Eugene Kirk and Mr. H. M. Reel of Youngstown, consulting engineers, on June 9, 1908, were approved, with the understanding that the village shall install a sewage purification plant of a design satisfactory to the State Board of Health whenever this is deemed necessary by said Board.

REPORT ON PROPOSED SEWERAGE FOR MINGO JUNCTION.

On February 14, 1908, there was submitted by Mr. Frank McLister, village clerk of Mingo Junction, a plan showing proposed system of sewers for that village. On February 21, 1908, the chief engineer visited Mingo Junction and made the necessary inspection. The following report was made:

Mingo Junction, located on the Ohio River about three or four miles below Steubenville, has a population of approximately 4,500. At present there are but few sewers in the village. An old sewer, 30 inches in diameter, drains the southerly part of the village, discharging into McMahon Creek. Short lengths of sewers, used principally for storm water purposes, exist in other parts of the village.

The water supply for Mingo Junction, furnished by a private company, is taken from the river through an infiltration crib located near the lower end of the village. Investigation by the State Board of Health has shown that the supply is not always safe, and it has never been unconditionally approved by the Board.

The proposed sewer on the combined plan is to pass through Commercial Avenue, the principal street of the village, and will then pass across private property and discharge into the Ohio River some 600 feet below the water works intake. The drawing submitted shows, in addition, short sewers discharging into the Ohio River near the upper part of the village. It is, however, not intended to construct these sewers at present. In any case, outlets above the water works intake should not be permitted.

March 9, 1908, the State Board of Health approved the combined sewer for the village, to discharge into the Ohio River 600 feet below the water works intake, as shown on plan submitted February 14, 1908; and disapproved the outlets, shown on the above mentioned drawing, which it was proposed to locate above the water works intake.

For the reason that the village might be called upon at some future date to purify its sewage, the Board was of the opinion that it would be very desirable and more economical to construct a separate system of sewers; one set of sewers for domestic sewage and one for storm water, instead of the very large main sewer proposed. By adopting the separate system, the sewers for the domestic sewage would be very much smaller than the combined sewers proposed; and it was believed that the storm sewers could by this plan be made shorter in length and of smaller diameter than the combined sewers proposed.

On March 12, 1908, a communication was received from Mr. Frank McLister, village clerk, stating that the contract for the District No. 2 sewer had been let and that on account of the large number of unemployed men in the village it was very much desired to proceed with the work. (This was one of the sewers disapproved on March 9, 1908). A reconsideration by the State Board of Health was asked for.

The chief engineer visited Mingo Junction on March 17, 1908, met the village clerk, council, and engineer, and discussed the plan with them. As a result of this conference the officials agreed to construct in the same trench with the proposed combined sewer a small sanitary sewer for District No. 2, to discharge through the approved outlet below the water works intake, and on March 20, 1908, an amended plan showing this change was submitted to the State Board of Health.

March 28, 1908, the Board approved the amended plan, submitted March 20, providing for a separate system of sewers for District No. 2, the domestic sewage to be conveyed to the outlet already approved by said Board, below the water works intake; and the proposed surface water sewer to discharge as shown on the original plan, upon the condition that council pass an ordinance prohibiting the use of the proposed storm sewers for house drainage of any kind, and that a certified copy of such ordinance be filed with the State Board of Health.

REPORT ON INVESTIGATION RELATIVE TO RECONSIDERATION OF PROPOSED SEWAGE PURIFICATION FOR NEW PHILADELPHIA.

On April 16, 1908, the chief engineer visited New Philadelphia in response to a petition asking for a reconsideration of the Board's recent action in regard to sewage purification for that city. The following report was submitted:

In November, 1907, the State Board of Health approved plans for sewerage and sewage purification for New Philadelphia, with the following conditions:

1st. That the sewage purification works be built before any of the new sewers are placed in use; and,

2nd. That the operation and management of the plant be at all times satisfactory to the State Board of Health.

At its meeting on January 22, 1908, there appeared before the State Board of Health a committee duly appointed by the city council of New Philadelphia, which committee submitted the following petition:

To the Honorable State Board of Health, Columbus, Ohio:

GENTLEMEN:—We, the undersigned, a committee appointed by the city council of New Philadelphia, Ohio, to secure a modification of a sewer plan prepared by Paul Murray and E. G. Bradbury, and approved by your Honorable Board in the fall of 1907, do hereby pray your Honorable Body to grant the following modification, to-wit: That the city be permitted to use the outlet of the present system as the outlet of the extended system until such time as the city shall be required to build reduction plant or disposal plant. We feel that our citizens cannot encounter the expense at the present of a reduction plant.

Very respectfully submitted,
(Signed) GEORGE WELTY.
(Signed) C. F. BASH.
Jan. 22, 1908. (Signed) GEO. F. WILLIAMS.

In addition, one of the members of the committee at the same time submitted the following petition:

To the State Board of Health, Columbus, Ohio:

GENTLEMEN:—I hereby petition you and entreat you that if, in your opinion, you shall find the present opening of the New Philadelphia sewer system which empties into the Tuscarawas River unsanitary, and it shall be your finding that no more sewage shall be dumped into the river at this point, that you permit the city to extend the main or trunk sewer farther down the river to a convenient place, and there empty the sewage into said Tuscarawas River.

Most respectfully yours,
(Signed) GEO. F. WILLIAMS,
Member of Committee, and representing three-fourths of the people of New Philadelphia who are without sanitary sewerage.

The State Board of Health considered these petitions and directed the Secretary to appoint a committee to visit New Philadelphia and report upon the situation. The Secretary appointed the chief engineer as such committee and he visited New Philadelphia, as above mentioned, and together with ten or twelve of the city officials inspected the local conditions. The above petition of the committee, i. e., "that the city be permitted to use the outlet of the present system as the outlet of the extended system," was first taken up and the present outlet visited.

This outlet is located close to the built up portion of the city near the foot of First Street and discharges through a railroad embankment at a point seven or eight feet above the average level of the stream, so that the sewage flows over the bank and gives off offensive odors, which were quite noticeable at the time of inspection on April 16th, although the weather was cool. It is stated on good authority that in addition to the odors coming direct from the sewage flowing over the bank, the stream itself, which is held back by a riffle just below the outlet, is in dry weather very offensive. It is further stated that this outlet, although constructed since the date when the State Board of Health was given jurisdiction over proposed outlets, was never approved by said Board. The outlet without doubt at the present time constitutes a serious nuisance and causes offensive pollution in the stream. Its use, therefore, for more sewage should under no circumstances be permitted.

Referring to the second petition, signed by George F. Williams, which petition appears to represent the desires and opinions of most of the city officials who were consulted at the time of inspection, it is believed that offensive conditions would be created in the river at whatever point the main sewer of the city might be discharged, unless the sewage were purified. The proposed extension of the sewerage system would make such conditions even worse.

The plans approved by the State Board of Health in November, 1907, provide for extending the main sewer to a point about 6,000 feet below the present outlet and there purifying the sewage by intermittent sand filtration on land which is well suited for this purpose. Filtering material of suitable quality is readily available at or near the proposed site.

On account of the topography and local conditions, little if any money could be saved by continuing the main sewer for a shorter distance than that proposed. The only saving, therefore, would be in omitting the sewage purification works, and this, as mentioned above, should not be allowed if the stream is to be kept in unoffensive condition.

The approved plans for sewage purification provide for ten acres of filters. This is very liberal and is more than will be actually needed for three or four years, in view of the fact that it is estimated that not over 4,000 people will use the sewers before that time. It would be reasonable, therefore, to allow the city to omit five acres of filters for the present; and these can be readily constructed, with local material, when needed.

At a meeting of the State Board of Health, held April 22, 1908, the following action was taken:

Permission to construct the proposed main sewer and to omit the purification works was refused; but the city is permitted to construct the main sewer and sewage purification works as approved, omitting the eight southerly filters for the present, provided, however, that additional filters be constructed and placed in use as, and whenever, deemed necessary by the State Board of Health. It should be understood that permission to amend the plans in this way does not in any other particular change the action of the Board on the proposed plans, as set forth in its letter of approval of November 6, 1907, to the board of public service.

REPORT ON PROPOSED SEWER FOR NEWTON FALLS.

On January 22, 1908, Mr. D. M. Hine, solicitor of Newton Falls, appeared before the Board on behalf of the village and asked approval of plans for a proposed sewer. The chief engineer visited Newton Falls on February 7, 1908, met the mayor and other officials, and made the necessary inspection relative to the proposed project. The following report was submitted:

The sewer proposed is to be installed for the purpose of draining a low, swampy area in the westerly portion of the village. This area, it is claimed, in addition to holding stagnant surface water, receives sink drainage and also at times some polluting matter from privy vaults. The sewer is to be about 1,200 feet long and 15 inches in diameter. It is to commence at the corner of Broad and Canal streets, extend through Canal Street to Jay Street, and discharge into the west branch of the Mahoning River at the foot of the last named street. The point of discharge is well below the proposed location of the water supply intake and is separated from it by a 15-foot dam.

Newton Falls covers a large area and is very sparsely settled. A complete sewerage system for the village at the present time would, therefore, be entirely out of proportion to the benefits derived. It is believed, however, that good sanitary conditions could be obtained with privy vaults, if the latter were correctly constructed and properly cared for. It would probably also be desirable to abandon the use of private wells, especially when the proposed public water supply is completed.

February 18, 1908, the Board approved this sewer, as shown on drawings submitted by Mr. D. M. Hine, January 22, 1908, provided the council of Newton Falls pass an ordinance prohibiting the use of the sewer for house connections or domestic purposes of any kind and restricting its use to surface and ground water drainage only.

REPORT ON PROPOSED STORM WATER DRAIN FOR NEWTOWN.

On September 29, 1908, a communication was received from the solicitor for the village of Newtown, stating that steps were being taken toward laying a storm water drain in the village, and asking whether this came under the provisions of the law requiring plans for proposed sewerage to be submitted to the State Board of Health for approval before being installed. Mr. West was informed by the Secretary of the Board that the plans proposed for Newtown, although for storm water purposes only, should be approved by the State Board of Health. The plans in question have been adopted by council.

The matter was referred to a committee. An inspection was made of the conditions involved on October 17, 1908, and the following report was submitted:

Newtown is a village of about 600 population, located in the easterly part of Hamilton County and bordering the Little Miami River. The village is but sparsely populated, and there is at present no sewerage system nor public water supply.

Beginning at a point near the center of the village, it is proposed to construct a drain, 14 and 18 inches in diameter and having a grade of 0.2 per cent, westerly through Main Street and northerly through Battle Alley to Plum Street; thence northwesterly to a point within 1,300 feet of Clear Creek, so-called; thence by open ditch to Clear Creek. The area thus drained, it is said, will be about 90 acres.

Clear Creek is a shallow basin or "bayou" extending parallel to the Little Miami River and about half a mile southerly therefrom. At times of extremely dry weather there is no flow from Clear Creek into the river, although under ordinary conditions there is such a flow. Clear Creek is therefore fed largely by spring water.

The discharge into Clear Creek of surface water from the village, at the point proposed, would not cause offensive or unsanitary conditions to any one living or owning property along the creek, or to the residents of Shademore, which is located on the banks of the Little Miami River over half a mile north of the proposed point of discharge of the drain. It is important, however, that no household wastes be discharged into the proposed drain and also that the heavier street sweepings be retained in catch basins at the inlets, which basins must be cleaned out at regular intervals.

November 2, 1908, the State Board of Health approved a storm water sewer for the village of Newtown, north from Main Street near the center of the village through Battle Alley, and thence northward to Clear Creek, as indicated on plan on file with the Board; provided:

1st. That the village council first pass an ordinance forbidding the tapping of said drain for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind, and file a certified copy of this ordinance with the State Board of Health;

2nd. That there be located at every point where street washings are to enter said drain, catch basins of a design satisfactory to the State Board of Health and so constructed as to retain a considerable portion of the solid material.

REPORT ON PROPOSED SEWER FOR NEY.

On October 30, 1908, a communication was received from Mr. A. P. Ridenour, mayor of the village of Ney, requesting the approval of the State Board of Health for a proposed sewer. The matter was referred to the engineering department and a representative of that department visited Ney November 18, 1908, to make the necessary investigation. The following report was submitted:

The village of Ney is located in the north-central portion of Defiance County on a small stream known as Lick Creek, which is a tributary of the Tiffin River, about four miles distant. Two branches of Lick Creek unite in Ney to form the main stream. The northern branch always contains flowing water, but gets very low during the summer months. The south branch is somewhat smaller than the north branch and during very dry seasons, such as occurred during the present year, has no flow.

The population of Ney at the present time is estimated at 400. The area within the corporation limits is about one-twentieth square mile. The local topography may be described as gently rolling. The drainage within the village is both east and west, but by far the greater portion goes to the eastward and ultimately finds its way into Lick Creek. Ney lies in the glacial region of the state and the rock in the vicinity is covered to a thickness of about 100 feet with drift deposits. Ohio shale is found at depths of from 100 to 150 feet.

The village of Ney has practically no public improvements in the way of paved streets, water works, etc., but on the whole presents a neat and cleanly appearance. The only sewerage within the village comprises one line of 6-inch vitrified pipe laid with uncemented joints and extending along the north side of Main Street. This sewer was originally constructed for carrying off storm water, but it is understood that several connections have been made for cellar drainage. Apparently these wastes are not objectionable, since at the time of inspection there was no appearance of nuisance at the outlet into Lick Creek. There is practically no modern plumbing in Ney and outdoor privies are still in general use. Owing to the smallness of the village and the fact that there is no public water supply, there has been little need for sanitary sewers other than for cellar drainage.

Proposed Sewer.—For the purpose of carrying off storm water from Main Street more effectively and in order to afford cellar drainage to the buildings and residences along the south side of that street, it is now proposed to construct a sewer which will have an outlet into the southerly branch of Lick Creek at the south side of the west abutment of the Main Street bridge. From the information obtained locally, it appears that it is intended to construct this sewer in a very crude manner. It is to be built of ordinary field tile and presumably on an uneven grade, since it was stated that the general surface slope would be followed. The total length of the sewer is to be 1,515 feet or about 0.28 mile, composed of the following sizes of pipe: 10-inch tile, 739 feet; 8-inch tile, 352 feet; 7-inch tile, 170 feet. The sewer will be laid at a depth of 6 or 7 feet, which will permit the drainage of all the cellars on the south side of Main Street. It is understood that as soon as the sewer is constructed, ten to twelve connections will be made for cellar drainage and one connection will be made to provide for the overflow from a cesspool. The cellar connecnections will undoubtedly be used for carrying off waste laundry water and various forms of sink drainage, though probably not (for the present at least) closet wastes. It will no doubt be found that in the course of a few years a number of the residences will be equipped with modern plumbing and that the cellar drain connections will be found very convenient channels for carrying off general domestic sewage. It would seem, therefore, reasonable to expect that with present intentions, before a great while the discharge from the outlet at the Main Street bridge will become a public nuisance. Aside from the nuisance, the discharge of sink drainage or sewage into the creek would be objectionable, since the stream flows through pasture land and is used for cattle watering.

At a meeting of the State Board of Health, held December 10th, 1908, plans for a proposed storm water sewer for the village of Ney, with an outlet into the southerly branch of Lick Creek at the south side of the west abutment of the Main Street bridge, were approved; provided, that an ordinance be passed by council forbidding the tapping of the proposed sewer or any sewers which may in the future be tributary thereto for the purpose of admitting water closet wastes, cesspool overflows, sink drainage, or household wastes of any kind; and that a certified copy of said ordinance be filed with the State Board of Health.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR NILES

On January 20, 1908, plans for a sewage purification plant for Niles were submitted by Messrs. E. G. Bradbury and George P. Shute, consulting engineers. These plans were prepared by the consulting engineers in co-operation with Mr. William Wilson, city engineer. At a meeting of the Board, held January 22, 1908, these plans were referred to the chief engineer for investigation and report. He accordingly visited Niles February 7, inspected the territory involved, and made the following report:

Niles is situated on the Mahoning River eight or ten miles above Youngstown. The city has a population at the present time of about 10,000. The discharge of sewage into the river has an important relation to the Youngstown water supply. The population using the existing sewers is said to be from 3,000 to 4,000. The sewage which may be expected in the near future is, therefore, about 300,000 gallons, which amount will probably be doubled within the next five or ten years. There are no manufacturing wastes to complicate the character of the sewage.

A general plan for a sewerage system for the city of Niles was drawn by Mr. Alexander Potter of New York in 1893. This plan was completed a few months after the legislature passed a law making it necessary for such plans to be submitted to the State Board of Health for approval, and was not submitted to the Board. Only a few sewers were constructed in accordance with the plan.

In 1907, in connection with a proposed sewer in Vienna Avenue, it was discovered that the general plan for sewerage for the city had never been approved by the State Board of Health, and therefore this plan was submitted at the meeting of the Board on January 23, 1907. The plan was approved on this date, provided that a sewage purification plant satisfactory to the State Board of Health be introduced before any more sewers were constructed for domestic use. The Board further suggested that all sewers built in the future should be on the separate system instead of on the combined system as shown on the original plan. The city of Niles soon after retained a consulting engineer to co-operate with the city engineer in the preparation of plans for sewage purification. These plans are now submitted for approval.

PROPOSED PLANS.—The proposed plans provide for purifying the sewage on a tract of land of about fifteen acres, located on the southwesterly side of the Mahoning River near the southerly corporation limits. No plans are submitted showing the construction of the sewer which is to convey the sewage to this place. It is stated, however, that the sewage will probably be conveyed by a main sewer on the easterly side of the river to a pumping station located across the river from the disposal plant, at which station the sewage will be pumped to the plant by electric power.

It is intended to construct a sewage purification plant capable of purifying 750,000 gallons, with provisions for future extension to 1,500,000 gallons. The method of sewage purification proposed is septic tank treatment followed by contact filters and final treatment in intermittent filters of fine cinders.

On reaching the plant through the force main, the sewage is first discharged into septic tanks. These are three in number, each 70 feet by 20 feet by 9 feet deep, and have a total capacity of 250,000 gallons or eight hours' flow. Provision is made for draining the bottom of all tanks, and the sludge is to be discharged onto a sludge bed 80 feet by 30 feet filled with cinders.

The contact beds for present installation are five in number, each one-fifth acre in area and five feet deep, making a total area of one acre. They are to be drained by three lines of 8-inch drains laid on an 0.8 per cent grade. The operation of the contact filters is to be controlled by automatic siphonic apparatus. The filtering material for the contact filters will be coarse mill or locomotive cinders crushed and screened, similar to the material in use at Mansfield.

The contact filters are to discharge upon intermittent filters of fine crushed cinders to be operated on the intermittent sand filtration plan. These filters are five in number and have a total area of 1.5 acres. The effluent from each contact bed can be discharged upon one or two of the intermittent filters.

The rate of filtration with the contact filters is 750,000 gallons per acre per day, and with the intermittent filters is 500,000 gallons per acre per day. The double treatment at these rates ought to provide a very satisfactory effluent. However, as the Mahoning River some ten miles below Niles is used by the city of Youngstown for a public water supply, it may prove in the future desirable to disinfect the effluent from the sewage purification plant by means of chloride of lime or other chemicals. Some provision should, therefore, be made so that this disinfection can be accomplished in the future.

March 21, 1908, the Board approved these plans, submitted January 20, 1908, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That detailed drawings of the controlling devices be submitted to and receive the approval of the State Board of Health;

3rd. That plans of the pumping station, when prepared, be submitted to and receive the approval of the State Board of Health; and,

4th. That provision be made for future installation of basins in which to disinfect the final effluent.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR OXFORD.

On December 10, 1908, The Riggs and Sherman Company of Toledo, consulting engineers for the village of Oxford, submitted plans for proposed sewage purification for that village, and also a general drawing showing the location of the sites proposed. The plans were referred to the engineering department, and there was submitted the following report:

Oxford is a village of about 2,500 inhabitants, located in Butler County on the watershed of Four Mile Creek, a tributary of the Great Miami River. The village is an educational center. There are located there, Miami University, Oxford College, Western College for Women, and Oxford Retreat.

The village is provided with a public water supply which is generally used. There is at present no sewerage system, except for the colleges. The sewage of two of these, Miami University and Western College for Women, is disposed of in an objectionable manner, and it is important that conditions at these places be remedied.

On December 14, 1906, plans for a complete sewerage system together with sewage purification works were submitted to the State Board of Health by Mr. Alexander Potter of New York, and after investigation were approved in December, 1906, "provided that the operation of the purification plant be at all times subject to the approval of the State Board of Health, and that the plant be enlarged when deemed necessary by said Board." These plans, however, were not immediately carried out on account of difficulty in raising funds.

The sewers as planned by Mr. Alexander Potter are now being built. As the plans of the present consulting engineers for sewage purification differ from those already approved, they have been submitted for approval. Bids are now being asked for the sewage purification plant on both sites, it being the intention to choose the site after these bids have been considered.

As the sewers are not yet completed, the number of connections therewith will be very small for some time in the future. The present consulting engineers estimate that not more than 1,500 people, exclusive of Miami University, will use the sewers for a number of years to come. It is understood that the present plans provide for treating a maximum flow of 200,000 gallons per day. From the study of the situation by representatives of the State Board of Health, however, it would seem that 100,000 gallons per day would be as much as need be provided for by a sewage purification plant at the present time. In discussing the plans, therefore, it is considered that the plant is based on a nominal capacity of 100,000 gallons per day.

The plans for sewage purification which have been approved, consist of septic tanks and contact filters of gravel. It is now proposed to use sedimentation tanks and sand filters.

A 15-inch trunk sewer will discharge into a screen chamber where the sewage will pass through screens and thence into two grit chambers (these grit chambers are undesirable with the separate system of sewers), from which it will pass into the sedimentation tanks. These tanks are two in number, each 42 feet by 10 feet by 10 feet deep, having a total combined capacity of over 60,000 gallons. The tanks are to be covered by a reinforced concrete roof with manholes placed at frequent intervals.

There are several feet of fall from the sedimentation tanks to the dosing chamber, so that a system of concrete steps has been planned over which the sewage from the tanks is to pass to the filters during warm weather. In freezing weather, the sewage will pass to the filters in a 15-inch vitrified pipe. The sludge may be drained off from the bottom of the sedimentation tanks and discharged onto a sludge bed which has an area of 2,000 square feet. The effluent from the tanks is drawn off over a weir, protected by a baffle, at the lower end of the tank and passes to the dosing devices, from which it will be discharged onto the sand filters. No details of the dosing devices are given. The dosing chamber is 22 feet by 16 feet by 4 feet deep, thus permitting each filter to be flooded at each dose to a depth of about 1½ inches.

The sand filters are four in number, each 150 feet by 80 feet, having a total combined area of somewhat over an acre. They are to be filled with about three feet of sand and gravel. The filters are well provided with distributors and underdrains. The quality of the sand is not specified, it being requested that approval of this feature be reserved until after the contract is let, at which time samples will be submitted to the State Board of Health.

The plans, although not in as great detail as would be desirable, indicate that the method proposed will be very satisfactory for the case in hand, and that the size of the plant will be ample to care for the needs of the village for some years in the future.

December 24, 1908, the State Board of Health approved plans for proposed sewage purification works for the village of Oxford, as shown on plans submitted by The Riggs & Sherman Company, consulting engineers, on December 10th, 1908, provided:

1st. That detailed plans showing the automatic controlling devices be submitted to the State Board of Health for approval before the work is begun.

2nd. That samples of all filtering material be submitted to the State Board of Health for approval before such material is placed.

3rd. That the village purchase, as a site for sewage purification, an area of land of such size that the filters need not be less than 300 feet from the boundary of the property at any point.

4th. That detailed plans showing the screens, be submitted to the State Board of Health for approval.

5th. That the proposed grit chambers be omitted.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR PIQUA.

On August 24, 1908, there was received from Mr. H. E. Whitlock, city engineer of Piqua, a blue print showing proposed sewers for East Piqua together with request for approval of same. One of the assistant engineers, Mr. Hansen, visited Piqua on August 28, 1908, and made an investigation of the proposed scheme as well as an inspection of existing sewers. From data collected by the assistant engineer, the following report was made:

The city of Piqua is located in Miami County on the Great Miami River and has a population of about 14,000. The area within the corporation limits is about 3.7 square miles.

The more thickly populated portion of the city is provided with sewers built on the separate system, and these are being gradually extended. There are now about six miles of these sewers, which discharge through an outlet established previous to the time of jurisdiction by the State Board of Health over sewer outlets.

The discharge of sewage into the Great Miami River does not at present in itself cause a nuisance. The stream, however, receives a large amount of manufacturing wastes which make its condition offensive at times of low water.

On April 24th, 1907, the State Board of Health approved plans for a short storm-water system in the northern part of the city. This system has just been completed and placed in service.

It is now proposed to construct a system of sewers on the combined plan for the easterly part of the city, as shown on blue print submitted. For the immediate future it is intended to build only a portion (about 0.66 mile) of the proposed sewers.

In view of the fact that the city will before very long in the future have to consider the purification of the sewage, it would be unwise to construct any combined sewers at the present time.

September 11, 1908, the State Board of Health disapproved proposed sewers for East Piqua, as shown on a drawing submitted by Mr. H. E. Whitlock, city engineer, on August 24, 1908, unless council first pass an ordinance forbidding the tapping of the proposed sewers, or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind; a certified copy of such ordinance to be filed with the State Board of Health before the contract for the proposed work is let.

On October 14, 1908, a plan showing proposed combined sewer in Second Street, East Piqua, together with request for approval of same, was received from Mr. H. E. Whitlock, city engineer. One of the assistant engineers visited Piqua on August 28, 1908, for the purpose of investigating and reporting on a similar project.

The new plan was referred to the chief engineer, who reported that the plan now submitted, for a 36-inch sewer in Second Street to discharge at the foot of that street, was not radically different from the plan disapproved by the Board in September, 1908.

At a meeting, held October 20, 1908, the State Board of Health approved of plans for a proposed sewer in Second Street, East Piqua, as shown on drawings submitted by Mr. H. E. Whitlock, October 14, 1908, in view of the fact that an ordinance had been passed, dated July 2, 1907, by the council of the city of Piqua, prohibiting the tapping of any storm sewer in the city for sanitary drainage.

REPORT ON PROPOSED SEWERAGE FOR STRUTHERS.

On April 7, 1908, there was submitted by Mr. George M. Montgomery, civil engineer for Struthers, a plan showing proposed sewerage system for that village. In anticipation of this plan being submitted, the chief engineer visited Struthers on April 1, 1908, met the village engineer, members of council, and inspected the territory involved. The following report was made:

Struthers is a village of about 3,000 population, located in the valley of the Mahoning River about two miles below the southeasterly border of the city of Youngstown.

There are at present no sewers in Struthers except a few private drains which discharge into Yellow Creek, a small stream which passes through the center of the village to the Mahoning River. The lack of provision for carrying off surface water has caused considerable damage during heavy storms.

A public water supply for Struthers is obtained from a large reservoir formed by impounding Yellow Creek about half a mile southwest of and at a considerable elevation above the village. This supply is operated by a private company and was approved by the State Board of Health a few years ago. It is used to a considerable extent for domestic purposes by the inhabitants of Struthers.

Proposed Plan.—The plan proposed provides sewerage for District No. 1, which constitutes all of the village with the exception of a small portion lying northeast of the river. The area of the district is 330 acres. The plan provides for a practically separate system of sewers and includes 34,000 feet of 8-inch pipe, 8,000 feet of 10-inch, 2,000 feet of 12-inch, and 300 feet of 18-inch pipe. Most of the domestic sewers are 8 inches in diameter.

The storm sewers are provided with outlets into Yellow Creek at three different points. From Main Street to the river is a 3-foot sewer which it is desired to use as a combined sewer until sewage purification works are installed. The system is capable of providing for sewer drainage for the village for a considerable number of years in the future. The outlet for the domestic sewage together with some storm water is into the Mahoning River at the Bridge Street bridge. As is well known, the Mahoning River at this point is very badly polluted with the sewage of Youngstown, so that the water is fit only for use for cooling purposes at the steel mills. A few miles below Struthers is the village of Lowellville, which is located just above the Pennsylvania state line.

The system is so arranged that when a sewage purification plant is installed the entire flow of domestic sewage, with the exception of that from a few houses on Union and Liberty streets, can be conveyed by gravity and without unnecessary expense to a suitable site for sewage purification works below the village.

Struthers is badly in need of a sewerage system, as the satisfactory use of cesspools is impossible; and the free use of the public water supply makes the amount of liquid wastes to be disposed of quite large. The proposition of a sewerage system is to be submitted to the voters in the near future, and the mayor and council desire that a temporary outlet into the Mahoning River be permitted in order that the cost of the proposed work may not be made so great that the proposition will be defeated at the polls.

April 11th, 1908, the Board approved the plan for a sewerage system for Struthers, as shown on a drawing submitted April 7, 1908, with the understanding that the village shall be called upon to install a sewage purification plant, of a design satisfactory to the State Board of Health, whenever this is deemed necessary by said Board.

REPORT ON PROPOSED SEWER IN SOUTH STREET, STEUBENVILLE.

On February 3, 1908, there were received from Mr. J. N. Leech, city engineer of Steubenville, plan and information regarding proposed sewer in South Street; this plan was drawn by Mr. S. B. Curfman, former city engineer. The chief engineer visited Steubenville on February 21, 1908, and made an inspection of the territory in question. The following report was submitted:

The area to be drained by the new sewer in South Street covers about eighteen acres. A portion of this area that already drains into Wells Creek through an existing sewer will be diverted into the proposed sewer. The proposed sewer will be on the combined plan, similar to all the sewers in Steubenville which have been built to date. The population that is expected to use the sewer in the immediate future is 1,750. As the area drained consists of a well settled residence district, this number may be considerably increased in the future. The sewer is designed to carry 6,000 cubic feet per minute and is expected to carry away one inch of rainfall in ten minutes, sixty per cent reaching the sewer immediately. The proposed sewer has a total length of 1,371 feet.

The grade is very steep. The outlet is into the Ohio River at the foot of Third Street.

Within the last three or four years the State Board of Health has approved sewerage for several districts in Steubenville of about the same size and character as the one now under consideration. In designing all these sewers there has been kept in mind the building of an intercepting sewer to convey the entire output from the city to a point below town. If desired to purify the sewage, it will be a comparatively easy matter to separate the domestic and storm sewage by constructing new domestic sewers in certain streets and eliminating storm water from other sewers. Furthermore, the present city engineer is planning to build all new sewers, after the South Street sewer is built, on a separate system.

The proposed outlet is two or three miles below the Steubenville water works intake. The next community down-stream which might be influenced by the Steubenville sewage is Mingo Junction, which village takes its water supply from the Ohio River through an infiltration crib.

March 2, 1908, the Board approved this proposed sewer in South Street, in accordance with plan drawn by Mr. S. B. Curfman, former city engineer, and submitted February 3, 1908, by Mr. J. N. Leech, city engineer of Steubenville, provided the outlet be so constructed that the dry weather flow will be discharged below the lowest water level in the river at all times.

REPORT ON PROPOSED SEWERAGE FOR SYLVANIA.

At the meeting of the State Board of Health on April 22, 1908, plans were submitted by The Riggs and Sherman Company of Toledo for proposed sewerage for Sylvania. These plans were referred to the chief engineer, who examined them and reported as follows:

Sylvania is a village of about 1,000 population, located in Lucas County some nine and one-half miles northwest of Toledo. It is situated at the confluence of the north and south branches of the Ottawa River, or Ten Mile Creek, which flows through the city of Toledo.

At the present time there are no sewers of any kind in Sylvania, with the possible exception of a few private drains. The village is not thickly settled and privies are in general use.

In June, 1907, plans were submitted for storm water sewerage for the village, drawn by L. T. Owen, C. E., of Toledo, and were approved by the State Board of Health provided that the council pass an ordinance prohibiting the use of the sewers for water closet wastes, sink drainage, or household wastes of any kind.

As many of the citizens wished to secure domestic sewers, the above system was never built. It is now desired to carry out the plans submitted April 22, 1908, instead of those formerly approved.

The plans now proposed consist of nearly 17,000 feet of a separate system of sewers which will accommodate the entire village, although only 6,000 or 7,000 feet will be built at the present time. About 200 people will use the sewers immediately and probably about 1,000 in the future. The system includes about 1,000 feet of new storm sewers discharging at two different points.

The outlet of the system will be into the south branch of Ten Mile Creek in the southeastern portion of the corporation, immediately above the confluence of the north and south branches of this stream. Ten Mile Creek, which has a dry weather flow of but a few cubic feet per second, passes below Sylvania through sparsely settled farm land for a distance of about eight miles until it reaches Toledo. Just before the stream reaches Toledo it passes through an extensive amusement park known as the "White City," which is frequented during the summer time by large numbers of people. A short distance below the "White City," it borders some land which has been set apart by the city of Toledo for public park purposes. Within and near Toledo the stream is more or less polluted by city sewage and during the summer time by sewage from the "White City."

The following extract from the 1905 Annual Report outlines the action which the State Board of Health has taken previous to 1905, protecting Ten Mile Creek, also called Ottawa River, within the city of Toledo:

ACTIONS RELATIVE TO SEWER OUTLETS INTO THE OTTAWA RIVER.—Auburndale District; comprises some 300 acres in northwesterly portion of the city, bounded by the westerly corporation line on the west and by the Ottawa River on the north. Two main outlets proposed, one a few hundred feet east of the city line and the other at the foot of Third street; outlets disapproved January, 1896.

Sewer District No. 26; easterly portion of Auburndale district described above; one main outlet, for domestic sewage only, at the foot of Third Street; approved "as a temporary expedient," October, 1896. This sewer has not been built as planned. Revised plans approved conditionally later. See below.

Sewer District No. 27; westerly portion of Auburndale district described above; one combined sewer outlet into the Ottawa River a few hundred feet east of corporation line, approved "as a temporary expedient," October, 1896. This sewer has not been built as planned. Revised plans approved conditionally. See below.

Sewer District No. 27; proposed modification of plans approved as above, which modification was to have consisted in the discharge of sewage from the southerly portion of the district into a ravine in Valley Street. This modification was disapproved in May, 1900.

Sewer District No. 16. Sub-district No. 1; located in the north-central portion of the city immediately south of the Ottawa River. Two proposed main outlets, one to discharge into Ottawa River immediately east of Detroit Avenue bridge; the other to discharge into Ottawa River near the corner of Blanchet Street and Manhattan Road; both these outlets to discharge into slack water caused by the lake. Approved August, 1903.

Sewer District No. 26; plans for an outlet for this district again submitted to the Board in October, 1903; approved "upon the condition that if in the future, examination of the water near the outlet, made by the State Board of Health, shows dangerous pollution a purification plant shall at once be installed," October, 1903.

Sewer District No. 27; plans for this district again submitted October, 1903, this time calling for combined sewers instead of sanitary sewers. Outlet approved October, 1903, subject to the same condition quoted immediately above for district No. 26.

Sewer District No. 40; location in the extreme northwesterly portion of the city, northwest of Ottawa River, opposite districts No. 26 and No. 27; the outlet of this district into Ottawa River approved October, 1903, subject to the same conditions imposed for districts No. 26 and No. 27 on the same date.

In 1905 the Board approved an outlet for Sub-district No. 1 of Sewer District No. 42, but only on condition that the outlet be continued well below land owned by the city for park purposes and be located in deep water (back water from Lake Erie), and that the sewage be purified when deemed necessary by the State Board of Health.

In 1906 the Board was asked to remove or modify the conditions attached to the above approval; but after investigation by a committee, the Board voted to sustain its former action in disapproving an outlet at the location proposed and suggested that a small sewage disposal plant be constructed for the district in question.

In 1907 after an investigation by a committee, the Board disapproved of the discharge of unpurified sewage into Ten Mile Creek from the "White City."

The small amount of sewage which would be discharged through the proposed sewers at Sylvania would probably not cause very objectionable pollution at the present time. However, in view of the location of Sylvania with reference to Toledo and because of the fact that Ten Mile Creek below the village may be used for stock watering, it would be very desirable to purify the sewage; although the local topography would require pumping the sewage if this is done.

May 12, 1908, the Board approved the plans, as shown on drawings submitted by The Riggs and Sherman Company April 22, 1908, provided that the sewage be purified in a manner satisfactory to the State Board of Health before the new sanitary sewers are used for purposes of any kind.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR SYLVANIA.

On September 8, 1908, a communication accompanied by plans was received from The Riggs and Sherman Company of Toledo, consulting engineers, asking for approval of proposed method of sewage purification for the village of Sylvania. The plans were referred to the engineering department and the following report was made:

PREVIOUS INVESTIGATIONS AND ACTIONS OF THE STATE BOARD OF HEALTH RELATIVE TO SEWERAGE AND SEWAGE PURIFICATION.—The matter of sewerage for Sylvania was first brought to the attention of the State Board of Health, May 16, 1907, when plans were submitted by Mr. W. B. Harris, clerk of council, for a system of storm sewers designed by L. T. Owen, C. E., of Toledo. The chief engineer of the Board visited Sylvania to make the necessary investigation and reported relative to the project June 3, 1907. Based upon this report, the State Board of Health voted to approve the system of storm water sewers, "provided that the village council first pass and file with the State Board of Health an ordinance forbidding the tapping of all sewers shown on this plan, and any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind."

The ordinance as above required was never passed, and on the whole the form of approval appeared to be unsatisfactory to the local authorities. At a later date the village retained the services of The Riggs and Sherman Company of Toledo, consulting engineers, to revise the original plans. The consulting engineers advised the installation of a separate system of sewers, the same to be designed in such manner that the entire flow of sanitary sewage might be conveyed to a single point near a suitable site for sewage purification works. The revised plans were submitted by The Riggs and Sherman Company on April 22, 1908. The request for approval stated that the funds of the village did not permit the introduction of purification works at that time, and that permission was desired for discharging the raw sewage into the stream until such time as in the opinion of the State Board of Health purification should become necessary. The matter was referred to the engineering department and reported on May 8, 1908. Based on this report, approval was given of the plans for a sewerage system as shown on the drawings submitted, "provided that the sewage be purified in a manner satisfactory to the State Board of Health before the new sanitary sewers are used for purposes of any kind."

As it seemed that the requirement of the State Board of Health for purification of the sewage immediately would defeat the project of installing the sewerage system, the consulting engineers requested another investigation. This investigation was made by a representative of the engineering department May 29, 1908, and a report thereon was submitted presenting in detail the various reasons offered by the local officials and consulting engineers why sewage purification should not be required immediately. The State Board of Health, however, after considering the matter reaffirmed its previous action.

The consulting engineers now propose to meet the requirements of the State Board of Health by installing a temporary works for sewage purification, which will meet the demands of the village probably until water works are installed.

Detailed accounts of general conditions at Sylvania and descriptions of the two projects for sewering the village may be found in the reports mentioned.

PROPOSED SEWAGE PURIFICATION.—Sylvania has a population of about 1,000 and growth slow. The village is primarily a farming center and has no industries of any importance. It is located at the confluence of the north and south branches of the Ottawa River, or Ten Mile Creek as it is sometimes called. The total drainage area above the confluence of the two branches is about 174 square miles. For the present, the prime function of the sanitary sewers will be for cellar drainage, and as there are not more than a dozen houses in the village provided with modern plumbing, it is not likely that the sanitary wastes will be large in volume.

The proposed temporary purification works are to be located on the point of land at the confluence of the north and south branches of the Ottawa River. The site selected is within 400 feet of two or three houses, and at distances of 500 and 600 feet there are several more houses. The works comprise a small screen chamber, which also serves as a grit chamber for removing the heavier detritus, and three intermittent sand filters.

The screen chamber is 8 feet long by 4 feet wide, interior dimensions. A sump about 20 inches deep is made for the interception of detritus. Beyond the sump and near the outlet is placed a screen 12 inches in height and of a length equal to the width of the chamber. The screen, which is set vertically, is made up of ¼-inch bars spaced one inch center to center. From the screen chamber the sewage may be diverted on to any of the three intermittent sand filters by means of hand-operated sluice gates.

The three intermittent sand filters are each 30 feet wide and 60 feet long at the sand line, thus providing for a total area of 0.124 acre. Samples of the filtering material have not yet been submitted, but it is understood that this is to consist of a 2-foot layer of coarse grain sand underlaid by a layer of coarse gravel 12 inches in thickness. The underdrains are to consist of lines of 6-inch soft field tile placed 10 feet center to center. These drains will enter a main drain of 10-inch vitrified bell end sewer pipe to be laid with cemented joints and ultimately to be used as a sewer for conveying the sewage of the village to the permanent sewage purification works, but which for the present will discharge in mid-stream at the confluence of the two branches of the river. The sewage will be distributed upon the beds by means of wooden distributor troughs extending across the beds and provided at the sides along their length with 1½-inch by 2-inch openings spaced at 2-foot intervals. It is believed that this arrangement will prove satisfactory, though applying the sewage in doses would permit a more complete covering of the sand area.

The works as shown on plans are not free from objections, notably the absence of a dosing tank and the low elevation of the plant with respect to the Ottawa River, which may at times cause it to become flooded. In view, however, of the small amount of domestic sewage that may be anticipated for some time to come, the plant will no doubt serve its purpose in a satisfactory manner if properly cared for.

At a meeting of the State Board of Health, held September 23, 1908, plans for sewage purification for the village of Sylvania, as shown on drawings submitted by The Riggs & Sherman Company, consulting engineers, on September 8, 1908, were approved upon the following conditions:

1. That samples of the sand and gravel to be used as filtering material be submitted to the State Board of Health for approval before being put in place.
2. That the village authorities institute and maintain a system of accurate records, showing when, where, and in what manner every connection to the sewers is made.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR SCHOOL HOUSE AT WATERVILLE.

On September 8, 1908, a letter was received from Mr. W. L. Haskins, clerk of the Waterville board of education, requesting approval of sewerage and sewage purification for the public school building of that village. On the same date detailed plans and a letter of explanation were submitted by the consulting engineers, The Riggs and Sherman Company of Toledo. The plans were referred to the engineering department and the following report was made:

The village of Waterville is in the southern part of Lucas County on the Maumee River, about sixteen miles above Toledo. The present population of the village is in the neighborhood of 1,000 and the growth is slow. There is no public water supply nor system of sewers, and from present indications it would appear that neither of these works are apt to be installed for a good many years to come.

The board of education, realizing the advantages of an indoor system of flush closets over the ordinary outdoor privies usually provided for school houses in villages of this size, desires in the absence of a public water supply and sewerage system to secure water for flushing closets from the Miami and Erie Canal about 1,000 feet distant, and to dispose of the sewage created by means of subsurface tile on the banks of the Maumee River.

The school in question has an attendance varying from 180 to 200 pupils, and there is no indication that the attendance will be materially increased.

The plans submitted show a 1½-inch galvanized iron pipe leading from the canal to the school building for supplying eight flush closets and one urinal. The canal level is high enough above the school basement to give sufficient pressure for this purpose. The sewage is to be carried away from the building through a 6-inch sewer pipe. This pipe will discharge into a settling basin having a capacity of 3,500 gallons, which presumably represents something over twenty-four hours' flow. The sewage from the settling tank discharges over a weir into a siphon chamber having a capacity of 900 gallons. At each discharge of the siphon, the sewage is conveyed through a 6-inch sewer pipe to a system of soft tile drains laid at a minimum depth of 2 feet below the surface of the ground. The lateral drains are of 3-inch tile, 100 feet in length. They are laid 20 feet center to center, extend to within 25 feet of the shore line and are at right angles thereto. The laterals are connected at their upper ends by means of a 6-inch header, also of soft drain tile. The entire system as planned covers about ¾ acre of ground. The material of which the soil is composed is a rather loose loamy earth with more or less limestone breccia interspersed. It is not an ideal filtering material such as might be used in an intermittent sand filter, but owing to the large area provided will probably suffice to effect an efficient purification of the sewage before it is able to find its way by seepage into the Maumee River. It is also stated by the consulting engineers that should there be an unforeseen growth of the school, there is available land whereby the system of tile may be extended in either direction.

At a meeting of the State Board of Health, held September 23, 1908, plans for sewerage and sewage disposal for a public school building of Waterville, as shown on drawings submitted by The Riggs & Sherman Company, consulting engineers, on September 8, 1908, were approved.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR WYOMING.

Plans for sewerage and sewage purification for Wyoming were submitted on May 21, 1908, by The Riggs and Sherman Company, consulting engineers for the village. Preliminary to the submission of these plans, Wyoming was visited by the assistant engineer on March 24, 1908, and the site for sewage disposal as well as other features relating to the proposed plans were investigated. The plans were referred to the chief engineer, who made the following report:

Wyoming is a residential village of about 1,500 inhabitants. It is located in Hamilton County a few miles north of the city of Cincinnati and borders on Mill Creek. At present there are few if any public sewers in the village. The proposed sewers call for some 27,000 feet of 8-inch pipe sewer and 8,000 feet of pipe sewer ranging from 10 to 18 inches in diameter; this totals about 6.7 miles. The sewers are all on the separate plan, and in addition to ordinary domestic wastes will receive a small amount of cellar drainage. They are estimated to accommodate the village for twenty-five years based on a population of 2,000. The main 18-inch sewer will discharge on to an area suitable for disposal works, located between Mill Creek and the C. H. & D. Railroad in the northeastern corner of the village.

Plans for sewage purification for the village of Wyoming were approved in 1902. These plans contemplate the use of septic tanks and contact filters. It is now desired partly on account of pending litigation regarding the septic process to change the plans. The method now proposed is plain sedimentation and sand filtration. The topographical conditions make it nescesary to pump the sewage, and for this purpose there is to be provided a 3-inch centrifugal pump driven by an electric motor to be housed in a small brick station located near the intersection of Oak Street and Mill Creek. The sewage is to be screened through a basket screen having a ½-inch open space, before it enters the pump well. This basket screen can be raised for cleaning. The bottom of the pump pit is 18 feet below the floor of the station. The sewage is forced through a 6-inch cast iron force main to the settling basins, a distance of about 500 feet.

The settling basins are two in number and are uncovered. Both are 60 feet long and about 7 feet deep. One is six feet wide and the other 12 feet wide. The capacities are, therefore, 18,000 and 36,000 gallons, respectively. The sludge can be drained by gravity on to a sludge bed about 40 feet square, which is composed of gravel between 1-8 and ½-inch in size. It is expected to remove the sludge from these tanks every two weeks.

The effluent from the settling tanks will pass into a dosing chamber, from which it will be automatically distributed in rotation on to four sand filters. Each of these sand filters is 110 feet square at the surface, thus giving a total area of about one acre. The filters will be 3 feet in thickness and will contain an upper layer of twelve inches of coarse sand, a middle layer of 12 inches of gravel between ⅛ and ½-inch in diameter, and a bottom layer of coarser gravel or broken stone. There will be seven parallel lines of 6-inch tile underdrains in each filter. The slope of the underdrains is not shown. Galvanized iron troughs will aid in the distribution of the sewage. The material of these troughs will probably not last as long as wood, under the action of the sewage.

The automatic distributing device is a patented apparatus made by the Miller Flush Tank Company. Similar apparatus has been in successful operation in this state. The size of the dosing tank is such that sewage will be distributed over the sand at each dose to a depth of 2½ inches.

As the probable population using the sewers for some years will not exceed 1,000, the area of filters proposed will be sufficient for present installation. The plant will probably have to be enlarged in the future, but the disposal site will permit of this.

May 26, 1908, the Board approved these plans, submitted on May 21, 1908, provided:

1st. That the management of the plant be at all times satisfactory to the State Board of Health, and that the plant be enlarged when deemed necessary by said Board; and,

2nd. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being used, it being understood that the size of material indicated on plans may not be satisfactory.

REPORT OF AN INVESTIGATION INTO THE CONDITION OF THE SEWERS IN THE NORTHWESTERN SEWER DISTRICT, ZANESVILLE.

Upon the request of the mayor, Dr. A. H. Gorrell, the chief engineer visited Zanesville on April 6, 1908, to make an investigation relative to odors complained of in the Northwestern Sewer District. Based upon this, and upon information furnished by the city engineer, Mr. Harris, and the sewer inspector, Mr. Morrow, who was present during the construction of the sewers in the Northwestern District, the following report was made:

The sewers in the Northwestern District have been constructed approximately in accordance with a plan approved by the State Board of Health in 1901 and as amended (with reference to the location of the outlet) in 1904. The principal deviation from the plan as approved by the Board has consisted in enlarging some of the lateral sewers, notably in Van Horn Avenue, Sherman Street, and Maple Avenue, and discharging storm water into them. There are some 50 storm water inlets in the district. It may be said that the lower part of the district is now sewered on the combined system, while the upper part is sewered on the separate system as originally planned.

The system is now in use by nearly one-third of the inhabitants of the sewer district; or at least permits for connections have been taken out by about this number. A considerable quantity of sewage is therefore being discharged at the outlet.

So far as could be learned, the chief source of complaint is due to odors said to arise from some of the storm water inlets. These storm water inlets are of various designs, but none of them are trapped. Some consist of a straight piece of pipe leading direct from the street to sewer without any "catch basin" or "sump" for the interception of such solid matter and debris as may be washed in from the street. Most of the inlets, however, are provided with some sort of a catch basin, but these are relatively small and the ones inspected needed cleaning. Two of the storm water inlets inspected were giving forth offensive odors.

The complaint of odors arising from the storm water inlets to the sewers in the Northwestern Sewer District is to some degree justified. It is believed, however, that with proper maintenance and regular and frequent cleaning of both catch basins and sewers, no odors need be created. As the main sewer is of such large diameter compared with the dry weather flow of sewage it ordinarily carries, there must be expected more or less deposits; but these can be readily removed by sewer cleaning devices such as are in use by the sewer departments of many cities.

A copy of this report was sent to the mayor of Zanesville April 7, 1908.

REPORT ON PROPOSED SEWERAGE FOR THE SOUTHWESTERN SEWER DISTRICT, ZANESVILLE.

A tracing showing general plan of proposed sewerage system for the Southwestern Sewer District of Zanesville was received from Mr. Henry I. Buell, designing engineer, on January 24, 1908. In anticipation of this plan being submitted, the location for the proposed outlet was inspected November 1, 1907, by Dr. Crossland, resident member of the Board, and by the chief engineer. Detailed sheets entitled "Grades and Sizes" were submitted April 16, 1908. The following report was made:

The territory for which the present system is designed covers 482 acres located in the southwestern portion of the city. The district in question is south of the Licking River and southwest of the Muskingum River. The present population is about 6,000.

The system proposed is for sanitary drainage only and when completed will comprise 100,518 lineal feet of sewer pipe ranging from 6 inches to 22 inches in diameter. The main outlet, 20 inches in diameter, will discharge into the Muskingum River at the rapids a few hundred feet below the dam.

The discharge of sewage through the proposed outlet cannot affect the Zanesville water supply, nor will it cause a local nuisance. The large flow of the Muskingum River is ample to inoffensively dilute the sewage from the Southwestern District.

At a meeting of the State Board of Health, held June 17, 1908, the plans for a sanitary sewerage system for the Southwestern District, Zanesville, as shown on a general plan submitted January 24th, 1908, and on detail sheets submitted April 16, 1908, by Mr. Henry I. Buel, designing engineer, were approved.

INVESTIGATIONS UNDER THE BENSE ACT

(99 Ohio Laws, Page 74.)

REPORT OF INVESTIGATIONS UNDER THE "BENSE ACT" FOR THE PROTECTION OF STREAMS AND PUBLIC WATER SUPPLIES.

In the proceedings of the Board given on an earlier page the various actions of the Board in regard to complaints under the Bense Act are given. Following is set forth the conditions found by investigation, and upon which such actions of the Board were taken.

REPORT ON INVESTIGATION OF POLLUTION OF TOWN CREEK BY SEWAGE FROM THE CITY OF VAN WERT.

On May 11, 1908, there was received from Messrs. N. F. Hattery and R. M. Dittoe, Jr., trustees of Hoaglin Township, Van Wert County, the following petition:

> TO THE STATE BOARD OF HEALTH IN AND FOR THE STATE OF OHIO, UNITED STATES OF AMERICA:
>
> We, the undersigned, trustees of Hoaglin Township, Van Wert County, Ohio, hereby notify you that the city of Van Wert, Van Wert County, Ohio, and the citizens of said city are discharging and permitting to be discharged sewage and other wastes into a stream known as Town Creek, which stream is a public water course and flows through the city of Van Wert, Ohio, and also through the said township of Hoaglin, Van Wert County, Ohio.
>
> You are hereby notified that by reason of the things above set out, towit:
>
> The disposal of sewage and other wastes into said stream has created and does create and is now creating a public nuisance detrimental to the health and comfort of those residing in the vicinity of such stream.
>
> You are further notified that such sewage and other wastes being discharged in said stream, as above set forth, has so corrupted said stream and water course so as to give rise to foul and noxious odors detrimental to the health and comfort of those residing in the vicinity of such stream and water course.
>
> You are hereby requested to take the necessary steps to have the above mentioned nuisance abated under House Bill No. 699, which was passed April 7, 1908, and approved by the Governor April 8, 1908, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution."
>
> (Signed) N. F. HATTERY.
> (Signed) R. M. DITTOE, JR.
> Trustees of Hoaglin Township, Van Wert County, Ohio.
>
> Dated at Van Wert, Ohio, this 9th day of May, A. D. 1908.

At the meeting of the State Board of Health on May 14, 1908, the above petition was considered and a committee consisting of the vice-president, Dr. Byron Stanton, and the chief engineer of the Board was appointed to visit Van Wert and investigate the conditions complained of. This committee made its investigations on May 27th and submitted the following report:

Van Wert is a city having a population estimated at about 8,000, located in the northwestern part of the state. It is the county seat of Van Wert County and is a prosporous trading center for the surrounding rich farming country, and in addition supports several manufacturing industries.

A small stream known as Town Creek passes through the center of the city in a general northerly direction. Into this stream are discharged storm water drains, sewers, and cesspool overflows. It is estimated that the number of persons contributing sewage to the stream, either direct or through cesspools, amounts to about one-third the population, or 2,500 people. This estimate is, however, somewhat high. It is impossible to determine the number of sewers in the city for the reason that most of them are private sewers put down without the consent of the city authorities. The clerk of the board of public service said that even in the case of the public sewers, there is no record of construction except for those laid during the last three years.

Your committee, accompanied by Mr. C. E. Lawhead, mayor, Mr. Clark Good, city solicitor, and Dr. C. G. Church, health officer, made an inspection of Town Creek through the city to a point near the lower or northerly corporation line. In addition the stream was inspected at three places within about three miles below the city, the lower two of which were in Hoaglin Township. On June 11, 1908, one of the assistant engineers of the Board made a survey of the stream through the city in order to gain information as to the feasibility and cost of intercepting sewer and sewage purification plant. The assistant engineer also obtained more detailed information in regard to existing sewer outlets. A list and description of these outlets is given in an appendix to this report.

Town Creek has a very small dry weather flow. At the time of inspection the stream was by no means at its lowest stage, as there had been considerable rainfall previous to day of inspection. The water of the stream before reaching the city was clear and unobjectionable. In passing through the city, however, due to sewage and other filth, it gradually became darker and more and more foul looking, until just below the city it would be classed as a distinctly polluted stream. The bed of the stream at this point contains six inches or more of putrefying sewage sludge, which has evidently been accumulating for years. This sludge, especially when stirred up, gives forth obnoxious odors. Some of these deposits were covered by a thin layer of gravel brought down by freshets. About two miles north of the city on the Paulding Road, the stream was discolored and contained decided evidences of sewage pollution. This was true at two other points in Hoaglin Township farther down. Even though the flow of water was considerably above the usual dry weather flow, the stream was unfit for stock watering and was distinctly polluted.

Information concerning the financial condition of the city was obtained from Mr. H. C. Redrup, city auditor. The total tax duplicate for 1908 is approximately the same as that for 1907; i. e., $2,659,210. The total bonded indebtedness is at present about $194,400; approximately $32,000 of this is for special assessment improvement bonds. As $154,360 of the above total indebtedness was incurred previous to the passage of the Longworth Act and would not be affected thereby, it would appear that the city is at the present time well within the legal debt limit as established by that act. Even without a vote of the people and without using the authority conferred by the Bense Act, it would be possible for the local council to appropriate one per cent of the total tax duplicate, or about $26,000, this year and like amount next year; or the local council could appropriate at least $100,000 with a vote of the people. However, under Section 5 of the Bense Act, it is not necessary to submit the question of the issuance of bonds to a vote of the people, provided such bonds will not exceed five per cent of the total tax duplicate.

The estimated cost of an intercepting sewer and sewage purification plant suitable for Van Wert will not, according to estimates made by the engineering department of the State Board of Health, exceed $55,000, or about two per cent of the tax duplicate. It is clear from the above that sufficient funds to cover the cost of the needed improvements can be provided without exceeding or even approaching the legal debt limit as fixed by the present statutes.

RECOMMENDATIONS.

In view of the fact that your committee has found, after investigation, that the sewage from Van Wert has corrupted the stream known as Town Creek so as to give rise to foul and obnoxious odors and to conditions detrimental to the health and comfort of those residing in the vicinity of the stream, it is recommended that the State Board of Health, with the approval of the Governor and Attorney General, notify the city of Van Wert to install sewage purification works satisfactory to said Board in the near future, and that the time for such installation be be provided without exceeding or even approaching the legal debt definitely fixed by said Board.

ORDER OF THE BOARD.

The following order to the Mayor and Council and the Board of Public Service of Van Wert, was issued January 4th, 1909:

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions existing in and adjacent to the city of Van Wert, Van Wert County, Ohio, as set forth in the complaint in writing, made to said State Board of Health by the trustees of Hoaglin Township, Van Wert County, Ohio, as required by

Section 1 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 8, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the said city of Van Wert, Van Wert County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Town Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Hoaglin Township, Van Wert County, who reside in the vicinity of said creek, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 16th day of September, 1908, notified such city so causing the contamination or pollution of such stream, of its said findings, and gave said city an opportunity to be heard before said Board, and

WHEREAS, On the 23rd day of September, 1908, pursuant to said notice, there appeared before the State Board of Health Mr. C. E. Lawhead, Mayor, Mr. H. C. Redrupp, City Auditor, and Mr. W. G. Edwards, Councilman-at-Large, representing said city, and the matters as contained in said complaint were then discussed and argued by them in the presence of said Board, and

THEREUPON, After such hearing and argument, the State Board of Health does find and determine that the following improvements or changes in said conditions aforesaid are necessary, and should be made, towit: That the city of Van Wert should be required to purify its sewage in a manner satisfactory to the State Board of Health on or before December 1, 1909;

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health are hereby ordered transmitted to the Governor and Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

(Signed) C. O. PROBST,
Secretary of the State Board of Health of the State of Ohio.

Columbus, Ohio, December 31, 1908.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 4th day of January, 1909.

A. L. HARRIS,
Governor of Ohio.
U. G. DENMAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF POLLUTION OF GREENVILLE CREEK BY THE SEWAGE OF GREENVILLE.

On June 9th, 1908, a petition was received from the trustees of Greenville Township, Darke County, reading as follows:

I, the undersigned, clerk of Greenville Township, Darke County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 6th day of June, 1908, adopted a resolution of which the following is a copy:

RESOLVED, That the city of Greenville, located in Darke County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Greenville Creek, and by reason thereof has so corrupted said Greenville Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Greenville Township, Darke County, Ohio, who reside in the vicinity of said Greenville Creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Greenville to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with "An Act to Authorize the State Board of Health to Require the Purification of Sewage and Public Water Supplies and to Protect Streams Against Pollution," passed April 7, 1908.

(Signed) L. E. WILLS.
Clerk Greenville Township, Darke County, Ohio.

Dated at Greenville, Ohio, this 6th day of June, 1908.

At the meeting of the State Board of Health held June 17, 1908, a committee consisting of the vice-president of the Board, Dr. Byron Stanton, and the chief engineer was appointed to investigate the conditions complained of and report thereon. On July 17, 1908, this committee visited Greenville, and submitted the following report:

The city of Greenville, the county seat of Darke County, has a population of about 8,000. It is located on Greenville Creek, a tributary of the Stillwater River, which stream in turn empties into the Great Miami River.

PAST ACTIONS OF THE STATE BOARD OF HEALTH.—On October 30, 1895, the State Board of Health approved a sewerage system and sewage disposal plant for Greenville, as shown on plans drawn by J. P. Force, consulting engineer.

On January 20th, 1897, the Board approved modifications of these plans, consisting in the omission of all parts of the sewage disposal plant except the screen chamber and filter beds.

On January 24, 1900, the Board approved of the entire omission of the sewage purification works "subject to the condition that within a period not to exceed five years from date, arrangements should be made for the purification of the sewage in a manner to be satisfactory to the State Board of Health."

At a meeting of the State Board of Health held April 24, 1907, it having been learned that no steps had been taken toward the installation of sewage purification works, the Secretary of the Board was instructed to notify the mayor and council of Greenville that "the Board will expect you to make provision for installing the sewage disposal plant without further delay." The minutes of the board of sewerage commissioners show an agreement between it and the State Board of Health to carry out the above condition of approval.

In July, 1900, a petition was received, signed by 246 persons residing near or having property on the stream below Greenville, requesting the State Board of Health to require the purification of the sewage of Greenville.

PRESENT SEWERAGE CONDITIONS. At the present time, there have been built in accordance with the plans approved in 1900 some 16 miles of sanitary sewers ranging in size from 8 to 15 inches in diameter. The main outlet discharges at low water level into Greenville Creek just below the Judy Road crossing. The official records show that there are some 850 houses connected with the sewers at the present time. These connections probably represent some 3,500 people. The city engineer stated that with possibly one exception, all the old sewers which were in use previous to 1900 have been connected with the new system; so that practically all of the sewage may be considered to discharge at the outlet above mentioned.

This outlet was inspected by the assistant engineer on December 29, 1905, during cold weather. The effect of the sewage on the stream even at that time was very marked, and noticeable deposits existed near the outlet.

A second inspection was made by the assistant engineer on April 15, 1906. At that time it was found that the stream immediately below the outlet was highly polluted and that sewage matter remained in pools near the banks, emitting offensive odors. Heavy accumulations of black sewage sludge lined the bed of the stream. The creek continued to be very offensive for 600 or 700 feet downstream. At a point half a mile down, offensive deposits were found in the stream bed.

Analysis of a sample taken April 15, 1906, at a point two miles downstream indicated that the water was "highly polluted and unfit for stock watering purposes, although the amount of decomposing organic matter was not sufficient to cause a nuisance." A sample taken about four miles below the outlet on the same date showed but slight improvement in the water over the point two miles below the outlet.

The inspection of your committee on July 17, 1908, was made at a time when the stream was said by some to be very low, but compared to previous inspections it seemed considerably above the low stage. On this date the condition of the stream immediately below the outlet was very bad, and extensive accumulations of filth were present in the stream bed. The swift current in the middle of the stream carries the sewage matter away rapidly so that visible and offensive pollution of the water was noticeable at a point nearly half a mile below the outlet.

There are located near the creek two or three slaughter houses which discharge more or less filth into it and may be responsible for some of the pollution. At the time of inspection, July 17, 1908, the slaughter house nearest the outlet was closed, and by comparing the condition of the water above and below the outlet it was clear that the effect of any of the slaughter houses on that date was not serious.

FINANCIAL CONDITION OF CITY.—According to the printed report of the city auditor of Greenville, the total indebtedness of the city (exclusive special assessments that do not count under the Longworth Act) was $193,126.21. The city clerk stated that since January, 1908, $5,480 in bonds has been issued and $5,385 has been redeemed, so that the total indebtedness has been increased only $95.

The council at the present time has offered for sale bonds to the amount of $26,500, for the purpose of building a bridge. These bonds, if sold, would bring the total indebtedness to $219,626.21. The total tax duplicate, according to the statement of the city clerk, is $4,016,780. If the bridge bonds are sold, therefore, the total indebtedness of the city will be 5½ per cent. of the tax duplicate. As under the Longworth Act a total indebtedness of 8 per cent may be incurred, the city could issue over $100,000 in bonds without reaching that limit.

Information from the state auditor's department, bureau of uniform accounting, corroborates the calculation that the city is well within its present debt limit under the Longworth Act; although under that act and disregarding the provisions of the Bense Act, the above mentioned bridge bonds, if sold, would prevent the issuance of more than $15,000 in bonds in the present year.

COST OF SEWAGE PURIFICATION.—As a sewer system and main sewer are already installed at Greenville and as a site for purification works is available near the existing outlet, the cost of sewage purification would be reduced to a minimum. It is estimated that for not more than $30,000 a plant can be constructed of sufficient size to treat the sewage of Greenville for several years in the future. The time required to install a plant would not be as great as in the case of cities where the main sewer must be constructed in connection with the purification works. Under proper supervision it is estimated that a sewage purification plant could be constructed in less than six months of actual work.

RECOMMENDATIONS.

In view of the fact that your committee has found, after investigation, that the sewage of Greenville has in its opinion so corrupted the stream known as Greenville Creek as to give rise to conditions detrimental to the health and comfort of those residing in the vicinity of the stream below Greenville, it is recommended that the State Board of Health notify the officials of the city of Greenville of its findings and give them an opportunity to be heard and show cause why the city of Greenville should not be required to purify its sewage on or before October 1,1909.

ORDER OF THE BOARD.

The following order to the mayor and council and the board of public service of Greenville, was issued January 4th, 1909:

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions existing in and adjacent to the city of Greenville, Darke County, Ohio, as set forth in the complaint in writing, made to said State Board of Health by the trustees of Greenville Township, Darke County, as required by Section 1 of an act of the General Assembly of Ohio entitled, "An Act to Authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 8, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the said city of Greenville, Darke County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Greenville Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Greenville Township, Darke County, who reside in the vicinity of said creek, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 16th day of September, 1908, notified such city so causing the contamination or pollution of said stream, of its said findings, and gave said city an opportunity to be heard before said Board on the 23rd day of September, 1908, and

WHEREAS, On the 23rd day of September, 1908, no representatives from said city of Greenville having appeared, a letter was presented from the city clerk of said city of Greenville, acknowledging the receipt of said notice to appear.

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health does find and determine that the following changes in said conditions aforesaid are necessary and should be made, towit: That the city of Greenville should be required to purify its sewage in a manner satisfactory to the State Board of Health on or before October 1, 1909.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health are hereby ordered transmitted to the Governor and Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

C. O. PROBST,
Secretary of the State Board of Health
of the State of Ohio.

Columbus, Ohio, December 31, 1908.

The foregoing report and findings having been examined by us, respectively the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 4th day of January, 1909.

A. L. HARRIS,
Governor of Ohio.
U. G. DENMAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF THE POLLUTION OF POE DITCH, BOWLING GREEN.

On June 9, 1908, there was received from Mr. J. B. Miller, clerk of Center Township, Wood County, the following petition:

I, the undersigned, clerk of Center Township, Wood County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 6th day of June, 1908, adopted a resolution, of which the following is a copy:

"RESOLVED, That the city of Bowling Green, located in Wood County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into the Poe Ditch, and by reason thereof has so corrupted said Poe Ditch as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Center Township, Wood County, Ohio, who reside in the vicinity of said Poe Ditch.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Bowling Green to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7, 1908."

(Signed) J. B. MILLER,
Clerk Center Township, Wood County, Ohio.

Dated at Bowling Green, Ohio, this 6th day of June, 1908.

Similar petitions were received on or about the same date from Freedom Township, Webster Township, and from the village of Pemberville, Wood County.

At a meeting of the Board on June 17, 1908, a committee, consisting of Dr. W. C. Chapman and the chief engineer, was appointed to investigate the conditions complained of. This committee visited Bowling Green on August 28, 1908, and investigated the pollution of Poe Ditch and its relation to the health and comfort of the residents of Center Township. The following report was submitted:

The city of Bowling Green has an estimated population of 5,000.

In October, 1900, the State Board of Health approved plans for an improved sewerage system for Bowling Green, provided:

1st. That present sewers now in use be abandoned for carrying house drainage.

2nd. That provision be made for purifying the sewage in a manner satisfactory to the State Board of Health within three years' time from the completion of the main outlet sewer.

The construction of this sewerage system was commenced about two years later. It is estimated that there have been constructed to date some two miles of sewers of various sizes. All connections with old sewers have, as far as possible, been cut off.

The records in the city auditor's office show that applications have been granted for 382 connections with the new sewers. The president of the board of public service and the city auditor estimate that at the present time about 150 of the existing connections are for water closets. A city ordinance adopted in 1901 makes it necessary that each sewer connection shall be provided with a catch basin with trapped inlet and outlet and screened at outlet for the purpose of retaining some of the solid matter in the sewage. The president of the board of public service states that all sewer connections have been provided with these catch basins.

There are two outlets for the improved sewer system. One of these, a 12-inch pipe, drains about one-fourth of a mile of sewers, accommodating a small territory south of Court Street and west of the T. & O. C. Railroad. This outlet discharges into the upper end of the Thurston Ditch. At the time of inspection, the estimated discharge was about 50,000 gallons per day. The flow contained evidences of sewage and an accumulation of paper just below the outlet, indicating the use to which the sewers had been put.

The main outlet, a 30-inch pipe, discharges into Thurston Ditch at Leroy Avenue. Through this outlet is discharged the greater part of the domestic sewage of the town. At the time of inspection the flow was somewhat over 100,000 gallons per day. The sewage was black, foul smelling, and contained large quantities of disintegrated toilet paper and other matters common to sewage. The flow in Thurston Ditch consisted entirely of the sewage discharged from the outlets above mentioned.

At the intersection of Thurston Ditch with Poe Ditch, 1,000 feet below the Leroy Avenue outlet, the sewage became worse in appearance, due to decomposition, and emitted very offensive odors. Deposits of foul matter could be detected along the sides of the ditch. Following down the Poe Ditch in an easterly direction, the conditions increased in offensiveness for a distance of about half a mile. At this point slimy, biological growth appeared on the surface of the water and caused offensive odors. The flat grade of Poe Ditch permits only a very slight velocity of flow, especially at its upper portion. In fact, the ditch is an elongated basin, and at the time of inspection was in effect a cesspool.

At a point about half a mile below the corporation line, the flow disappeared into the tile drain which is placed beneath the ditch. The flow from this point to the Portage River remained, for the most part, in this drain. At the outlet of this drain into the Portage River, on date of inspection, the flow was dark colored, contained evidences of sewage, and gave forth an offensive odor. It was noted that the discharge into the river appeared to be less than the discharge into Thurston Ditch, thus indicating absorption by the ground and consequent pollution of the ground water along the course of Poe Ditch.

The discharge of sewage from as many people as are connected with the sewers of Bowling Green, even though the connections be provided with catch basins, cannot be inoffensively disposed of by discharging into an open ditch, even though the ditch be underlaid with a tile which is covered with sand and gravel.

The only satisfactory remedy would be to dispose of the sewage by some approved method of sewage purification. A sewage purification plant suitable for the purpose could probably be built for $20,000, and a very satisfactory location is available within a short distance of the present outlet.

The city auditor gives the following statement regarding the finances of the city:

Total tax duplicate..................................	$1,977,680
Total indebtedness to date (exclusive of special assessments)	59,500
Debt incurred during present year......................	None

According to the above statement, the total indebtedness of the city is but little over three per cent, none of which has been incurred during the present year. Under the Longworth Act, therefore, without the aid of the Bense Act, and without a vote of the people, council could appropriate enough money to construct a sewage purification plant.

RECOMMENDATIONS.

The following recommendations are made:

1. That the State Board of Health find the conditions as reported by this committee.

2. That the city officials of Bowling Green be notified that, after investigation, the State Board of Health has found that the sewage from Bowling Green has so polluted Poe Ditch as well as Thurston Ditch as to give rise to foul and obnoxious odors, and to conditions detrimental to the health and comfort of those residing in the vicinity of said ditches; and give said city officials an opportunity to be heard and show cause why said city of Bowling Green should not install works or means for purifying its sewage before December 1, 1909.

ORDER OF THE BOARD.

The following order to the mayor and council and the board of public service of Bowling Green, was issued January 4th, 1909.

Whereas, The State Board of Health of the State of Ohio having under consideration the conditions existing in and adjacent to the city of Bowling Green, Wood County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the trustees of Center Township, Wood County, Ohio, as required by Section 1 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 8, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

Whereas, The State Board of Health, after investigating the conditions complained of, found that the said city of Bowling Green, Wood County, Ohio, is discharging and permitting to be discharged sewage and other waster into the Poe Ditch, and by reason thereof has so corrupted said ditch as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Center Township, Wood County, who reside in the vicinity of said ditch, and

Whereas, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 16th day of September, 1908, notified such city so causing the contamination or pollution of such stream, of its said findings, and gave said city an opportunity to be heard before said Board, and

Whereas, On the 23rd day of September, 1908, pursuant to said notice, there appeared before the State Board of Health Mr. J. P. Chase, city solicitor, Mr. Charles Garns, street commissioner, and Mr. E. N. Hubbard, councilman, representing said city, and the matters as contained in said complaint were then discussed and argued by them in the presence of said Board, and

Thereupon, After such hearing and argument, the State Board of Health does find and determine that the following improvements or changes in said conditions aforesaid are necessary, and should be made, towit: That the city of Bowling Green should be required to purify its sewage in a manner satisfactory to the State Board of Health on or before December 1, 1909.

Thereupon, On motion duly seconded, the report and findings of said State Board of Health are hereby ordered transmitted to the Governor and Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

C. O. Probst,
Secretary of the State Board of Health of the State of Ohio.

Columbus, Ohio, December 31, 1908.

The foregoing report and findings having been examined by us, respectively the Governor of Ohio and the Attorney General of the State of Ohio, the same are in all respects approved this 4th day of January, 1909.

A. L. Harris,
Governor of Ohio.
U. G. Denman,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF THE POLLUTION OF A DITCH AT HARTWELL BY SEWAGE FROM WYOMING, LOCKLAND AND HARTWELL.

On July 23, 1908, the board of health of Hartwell, through its clerk, Mr. M. B. Weighell, made complaint under the Bense Act to the State Board of Health, stating that the villages of Wyoming and Lockland were discharging sewage into a ditch tributary to Mill Creek, thereby creating conditions detrimental to the health and comfort of the citizens of Hartwell. The State Board of Health was requested to investigate the conditions complained of.

On July 28, 1908, the President of the Board appointed as a committee to investigate the conditions complained of, Dr. Stanton, vice-president, Dr. Warner, member, and the chief engineer. This committee visited Hartwell on August 8, 1908, and begs to submit the following report:

Hartwell is a village of approximately 2,000 population located about eleven miles north of the center of Cincinnati and in the valley of Mill Creek. It is a suburban residential town and contains practically no industries. Immediately adjoining Hartwell on the northwest is the village of Wyoming, and on the northeast the village of Lockland. These villages are of the same type as Hartwell and have populations of 1,500 and 3,000, respectively.

Extending along the westerly side of the C. H. & D. Railroad and immediately adjacent thereto, from a point near the Wyoming depot to a point near Section Avenue, Hartwell, is an open ditch. From Section Avenue to Mill Creek, into which the ditch discharges, the ditch is covered.

The conditions complained of result from accumulations of sewage in the lower part of the ditch just above Section Avenue, Hartwell. At the time of inspection, this portion of the ditch was badly polluted and was offensive to sight and smell. It was found, however, that this condition on the day of inspection was due entirely to a sewer in Burns Avenue, Hartwell, which discharges into the ditch a short distance above Section Avenue.

Above the Burns Avenue sewer outlet the ditch was dry for perhaps 1,000 feet. Above this point there was a small flow of clear water which disappeared into the gravelly bottom of the ditch. At Mills Avenue, which is the intersecting point of the Hartwell, Wyoming, and Lockland corporation lines, the flow was somewhat greater, but the quality of the water was not objectionable.

Following up the ditch to Cooper Avenue, it was found that sewage was being discharged at this point through a Wyoming storm sewer in about the same amount as was being discharged through the Hartwell sewer. On the day of inspection, the effect of this sewage extended only a short distance below the outlet.

At Worthington Street the ditch receives the discharge from three sewers on the Wyoming side, and one sewer on the Lockland side. The effect of this is to cause considerable pollution near and for perhaps 500 feet below the outlet. No definite information could be obtained as to the extent to which these sewers are used.

It is claimed by the complainants that an undue amount of surface drainage is diverted into the sewers of Wyoming as well as those of Lockland, and consequently the ditch at Hartwell in times of storms is not sufficiently large to carry off the flow.

PROPOSED SEWERAGE FOR WYOMING.—In May, 1908, the State Board of Health approved plans for a system of sewerage and sewage purification for the village of Wyoming. These plans are complete and when carried out will remove from the ditch all sewage pollution now originating in Wyoming. Bids for the construction of a portion of the sewers and the sewage purification plant are now being advertised, and it is expected that contracts will be let in the near future.

PROPOSED SEWERAGE FOR LOCKLAND.—In January, 1904, the State Board of Health approved plans for a system of sewerage and sewage purification for Lockland, the effluent to be discharged into Mill Creek. These plans have never been carried out.

PROPOSED SEWERAGE FOR HARTWELL.—In April, 1908, the State Board of Health approved plans for a system of sewerage and sewage purification for Hartwell. Although the matter of the construction of these sewers is still being agitated, the work has not yet been advertised.

CONCLUSIONS AND RECOMMENDATIONS.

1. The stream pollution at Hartwell was not at the time of inspection such as to give cause for complaint under the Bense Act; but the discharge of sewage by Lockland and Wyoming into such a small watercourse and within such a short distance of Hartwell must at times constitute a menace to the health and comfort of the citizens of that village sufficient to warrant action under said Act.

2. The investigation of the committee showed that the conditions complained of at Hartwell were being caused on the day of inspection entirely by the Hartwell sewer in Burns Avenue.

3. While the sewage from Wyoming and Lockland causes very objectionable pollution near and for a distance of several hundred feet below the outlets, the dry weather during and previous to the date of

inspection made it possible for the entire flow to be absorbed by the gravelly bed of the ditch at a point approximately 1,000 feet above Hartwell; thus protecting that village.

4. Communications should be sent to Wyoming, Lockland and Hartwell, urging that the plans for improved sewerage and sewage purification be carried out as soon as possible. These communications should be made especially emphatic in the cases of Lockland and Hartwell, as these villages have as yet taken no definite steps toward carrying out the plans which have been prepared and approved.

5. The matter of diversion of surface water into the ditch above Hartwell should be adjusted by the county commissioners instead of by the State Board of Health.

6. It would be advisable to make another inspection, at a later date, when the conditions for absorption in the ditch are not as favorable as they were at the time of the recent inspection.

REPORT ON INVESTIGATION OF THE POLLUTION OF PORTAGE CREEK BY SEWAGE FROM FOSTORIA.

On August 4, 1908, there was received from Mr. Chas. E. Risser, Clerk of Perry Township, Wood County, the following petition:

To the Ohio State Board of Health:

I, the undersigned, clerk of Perry Township, Wood County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 1st day of August, 1908, adopted a resolution, of which the following is a true copy:

"RESOLVED, That the city of Fostoria, located in Seneca County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into east branch of the Portage River, and by reason thereof has so corrupted said branch of river as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Perry Township, Wood County, Ohio, who reside in the vicinity of said branch of river.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Fostoria to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7, 1908."

(Signed) CHAS. E. RISSER,
Clerk Perry Township, Wood County, Ohio.

Dated at Perry Center, Ohio, this 1st day of August, 1908.

The President of the State Board of Health on August 5, 1908, appointed Dr. Chapman of Toledo, Dr. Warner of Columbus, and the chief engineer, a committee to investigate the conditions complained of. This committee visited Fostoria on August 20, 1908. The following report was submitted:

The city of Fostoria, located in Seneca County adjacent to the southeasterly corner of Wood County, has an estimated population of 10,000.

The sewerage system, which has been gradually developed since 1894, consists of about 23 miles of brick and pipe sewers. The brick sewers have a total length of 3.6 miles and range in size from 3 to 6 feet. The sewers receive both storm water and domestic sewage. The average dry weather flow is about 350,000 gallons per day.

The principal sewer is 18 inches in diameter and terminates at a sewage purification plant located a mile from the center of the city on the westerly side of Portage Creek within the limits of Perry Township, Wood County. The purification plant was installed in 1896. Discharging into the creek on the opposite side from the plant is a 6-foot brick sewer 1½ miles long. This sewer is used principally for surface drainage and also receives the overflow from a flowing well formerly used by the city water works. In addition, however, this sewer receives a certain amount of domestic sewage; and to prevent this sewage from discharging at all times into the creek, a small dam has been built in the sewer, near the outlet, but above the entrance of the well water. This serves to store the dry weather flow. The stored sewage is said to be pumped about every week across the creek to the purification plant.

The purification plant comprises a storage reservoir into which the main 18-inch sewer discharges, screens, sludge well a pumping plant, and a filtration area embracing about 20 acres. Two acres of this area consist of artificially constructed sand filters, four acres are underdrained with sanded trenches, and the remaining area consists of the natural clay soil underdrained. The pumping plant is operated in the daytime only, and the reservoirs are usually emptied in about four hours. When the volume of sewage is increased by rain, as must be expected with the combined system, the entire flow is passed directly into the creek. Furthermore, it is stated by the operator that whenever the screen is cleaned it is necessary to divert the flow of sewage into the creek.

The inspection of the committee on August 20th showed that the creek adjacent to and for some distance below the sewage purification works was very badly polluted by sewage and was giving off foul and noxious odors. The operator admitted that untreated sewage had been discharged into the creek. An inspection of the two gravel filters showed that they were heavily coated with sludge and that through excessive scraping the original depth of filtering material had been greatly decreased.

The discharge during the past year of acid iron wastes into the sewerage system has resulted in discoloring and to some extent clogging the filters. Such wastes also discolor the filtered sewage and the creek water. The wastes originate at the plant of The Seneca Iron & Manufacturing Company, and the volume of flow according to previous investigations is about 10,000 gallons per day, or about three per cent of the entire flow of sewage. Formerly these wastes were discharged directly into the creek with the effect of greatly discoloring it. A portion of the wastes continue to be so discharged through the Vine Street sewer.

The inspection of August 20th, together with information previously obtained by the Board, shows that the plant is not capable of properly caring at all times for the sewage of Fostoria, that it is not operated efficiently, and that the discharge of acid iron wastes into the sewers creates an unnecessary and unreasonable difficulty in purifying the sewage.

To remedy these conditions, the plant should be enlarged and remodeled so that it will never be necessary, under proper management, to discharge unpurified sewage into the stream unless it is first diluted in the sewers by approximately four times its volume of storm water. The two sand filters should be cleaned and refilled with suitable material to the original grade; and two new filters of the same size and capacity should be constructed. These changes may cost approximately $5,000.

The city auditor gives the following statement regarding the finances of the city:

Total tax duplicate..................................	$2,825,000
Total indebtedness, exclusive of special assessments....	216,000
Net amount of indebtedness incurred during present year	15,000

According to the above statement, the total indebtedness of the city is a little over 7½ per cent; $15,000, or slightly over half of one per cent, has been incurred during the present year. It would, therefore, be possible under the Longworth Act, without the aid of the Bense Act, and without a vote of the people, for council to appropriate enough money to make the necessary improvements in the sewage purification plant.

RECOMMENDATIONS.

The following recommendations are herewith made:

1. That the State Board of Health find the conditions as reported by this committee.

2. That the city officials of Fostoria be notified that, after investigation, the State Board of Health has found that the sewage of Fostoria has so polluted the Portage Creek as to give rise to foul and noxious odors and to conditions detrimental to health and comfort of those residing in the vicinity of the sewage purification works, and in the vicinity of the stream below said works; and that said city officials be given an opportunity to be heard and show cause why said city should not change and enlarge its existing sewage purification works in a manner satisfactory to the State Board of Health before June 1, 1909; such changes and enlargement to consist principally in the following:

(a). Filling the two existing sand filters up to the original grade of the surface with suitable filtering material; and installing two new filters of the same area.

(b). Changing the existing works so that it will never be necessary, under proper management, to discharge untreated sewage into the stream unless such sewage is first diluted in the sewers by four times its volume of storm water.

(c). Prohibiting the discharge into the sewers of acid iron wastes.

3. That the president of the Seneca Iron & Manufacturing Company be notified that, after investigation, the State Board of Health has found that the acid iron wastes from the plant of said corporation are causing through their discharge into the city sewers conditions which are detrimental to the process of purifying sewage and which are partially responsible for polluting the Portage Creek so as to give rise to foul and noxious odors and to conditions detrimental to the health and comfort of those residing in the vicinity of the sewage purification works, and the vicinity of the stream below said works; and give said president of The Seneca Iron & Manufacturing Company an opportunity to be heard and show cause why his corporation should not install purification works for treating said acid iron wastes before discharging same into the sewers of Fostoria or into the Portage Creek direct.

REPORT ON POLLUTION OF THE LITTLE MIAMI RIVER IN SYMMES TOWNSHIP, NEAR LOVELAND.

On September 14, 1908, there was received from Mr. Dan Veith, clerk of Symmes Township, Hamilton County, a complaint stating that the Victor Stamping Works of Twightwee is discharging sewage and other wastes into the Little Miami River and thereby creating conditions that are detrimental to the health and comfort of the citizens of Symmes Township. The President of the State Board of Health appointed a committee consisting of Dr. Warner, member, Dr. Stanton, vice-president, and the chief engineer, to investigate the complaint. The chairman of this committee made an inspection on September 21, 1908, and the other two members made an inspection on October 2nd, in which they were assisted by Mr. Dan Veith, township clerk, and Mr. John A. Knecht, superintendent of the Victor Stamping Works. The committee submitted the following report:

The little Miami River between Twightwee and Epworth Heights, about a mile below Loveland, is formed into a pool or pond by a dam farther down. Along this pond are located some twelve or fifteen summer cottages, and the pond is enjoyed by the occupants of these cottages as well as by large numbers of other people during the summer months. It is used for boating, bathing and fishing.

Complaint is made by the summer residents as well as by the permanent residents of Twightwee that on account of the discharge from the Victor Stamping Works the river is frequently badly discolored with iron wastes, so that it is unfit for bathing or for use for laundry purposes. It is further alleged that the sewage from the works and the houses adjacent thereto is discharged in such a manner as to cause conditions detrimental to the health and comfort of said residents. At the time of inspection, no acid iron wastes were being discharged from the sewer from the factory, although the deposits on the stones adjacent to the outlet showed that such wastes must recently have been discharged. At both outlets there were deposits which indisputably testified that these drains were used for discharging unpurified sewage.

The Victor Stamping Works located on the westerly side of the river at Twightwee employs some 75 men, a large number of whom with their families live in houses owned by this concern in the immediate vicinity. The business of the Victor Stamping Works is to manufacture several kinds of iron ware such as buckets, coal hods, etc. These articles after being finished in the rough are immersed for cleansing purposes in tanks containing sulphuric acid. They are then placed in the rinsing tanks and the excess acid and rust is washed off. Following this operation, the articles or at least a portion of them are submitted to a galvanizing process.

As far as could be learned, no liquid is wasted directly from the sulphuric acid tanks. When these tanks are cleaned, the contents are placed in barrels and allowed to evaporate, thus permitting the iron sulphate to crystallize out. This product is of value. With the galvanizing process, there is no opportunity for liquid waste. The rinsing tanks, however, which are two in number, each 20 feet by 4 feet by 4 feet deep and holding some 2,000 gallons, are drained into the river at more or less frequent intervals. It is undoubtedly the iron and acid from these tanks which causes the objectionable discoloration complained of in the Little Miami River.

In addition to these industrial wastes, the sewage from the factory, containing 75 employes, and also from the dozen or more dwellings above mentioned, together with storm water from these places, is discharged into the river through two outlets. It is said that the sewer from the buildings passes first into a small catch basin, the outlet of which is trapped. This could not be inspected as it was covered up. The purification effected, however, cannot be worthy of consideration.

In order to remedy the conditions complained of, three things should be done:

1st. The storm water should be separated from the domestic sewage; that is, separate drainage should be laid for each.

2nd. The sewage from the factory and from the houses adjacent should be conveyed into a large underground vault built with pervious sides so that the liquid can percolate into the extensive gravel deposits which exist in this locality. The top of the vault should be accessible so that it can be inspected and cleaned when necessary. There should under no conditions be any direct outlet to the river. The vault should be located well below the present lower outlet in order to avoid any possibility of contaminating the well which is used as a water supply for the factory.

3rd. The drain from the rinsing tanks, from which the acid iron wastes are discharged, should be cut off from the river and extended into a settling basin excavated in the gravel and holding some 10,000 gallons. The acid iron wastes, as they enter this basin, should be treated with sufficient lime to precipitate the iron. The basin should have no direct outlet to the river. The contents should be pumped out on to land if this becomes necessary.

The superintendent of the works realizes that the complaint in regard to the pollution of the river is justified, and he has expressed himself as willing to make whatever changes may be deemed necessary by the State Board of Health.

It is recommended that a copy of this report be sent to the superintendent of the Victor Stamping Works, accompanied by an offer of further assistance from the State Board of Health in abating the nuisance.

REPORT ON INVESTIGATION OF THE POLLUTION OF THE PORTAGE RIVER BY THE SEWAGE OF ELMORE.

On September 25, 1908, there was received from Mr. Frank E. Holtcamp, clerk of the board of health of Elmore, a petition reading as follows:

> I, the undersigned, clerk of the board of health of the village of Elmore, Ottawa County, State of Ohio, do hereby certify that the board of health of said village, being in session on the 23rd day of September, 1908, adopted a resolution of which the following is a true copy:
>
> "RESOLVED, That the village of Elmore, located in Ottawa County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into the Portage River, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Elmore, Ottawa County, Ohio, who reside in the vicinity of said stream.
>
> "The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Elmore to install such works of means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."
>
> (Signed) FRANK E. HOLTKAMP,
> Clerk Board of Health, Elmore, Ohio.
>
> Dated at Elmore, Ohio, this 23rd day of September, 1908.

On October 10, 1908, the president of the State Board of Health appointed Dr. W. C. Chapman and the chief engineer a committee to investigate the nuisance complained of. This committee visited Elmore on November 6, 1908, and submitted the following report:

The village of Elmore, having a population of about 1,000, is located in the southeastern corner of Ottawa County.

Elmore has no public water supply, but is fairly well provided with sewers, installed ostensibly for storm water purposes, but nevertheless freely used for sanitary drainage with the result that deposits form in the sewers, giving off offensive odors which rise into the streets through the storm water inlets. It is impossible to properly flush the sewers on account of lack of water.

The sewer which was causing the nuisance complained of in the petition above quoted is located in Toledo Street and discharges into the Portage River just below the bridge at the foot of that street. The sewer is of brick, 20 inches in diameter, and lies in a cut varying from 2½ to 16 feet. This sewer with the laterals connecting thereto has a total length of 3,900 feet. It is estimated that there are some 75 residences and buildings connected to the Toledo Street sewer for sanitary purposes. These include the buildings in the business portion of the town.

At the time of inspection the Portage River was at a low stage, but not as low as it had been some weeks previously. Nevertheless, the sewage around the outlet had the effect of badly contaminating the water and causing offensive odors.

In addition to the Toledo Street sewer outlet, there are four other important outlets, as follows: At Ottawa Street; the Lake Shore Railroad bridge; Cheapside Street; and at the cemetery. There are also six private sewers between Toledo Street and the cemetery. The discharge of sewage from these private sewers has the effect of further polluting the stream, though no one of the last named outlets adds as much pollution at a single point as does the Toledo Street sewer. The location of all of the other sewers, public and private, is shown on a map on file with the State Board of Health. Each house connection is also shown on the map.

All of the sewers, with the exception of that in Toledo Street, have been constructed since 1893, but no plans were ever submitted to the State Board of Health for approval.

The sewer in Cheapside Street has just been completed and a report thereon, treating the sewer as a proposed proposition, is being submitted to the State Board of Health for action.

Inquiry as to the financial condition of the village, with reference to its ability to construct an intercepting sewer and sewage purification works, showed that the total tax duplicate was $264,749 and that the total indebtedness exclusive of special assessments was not more than $4,340, or less than 1.7 per cent. Whether or not the village is in debt even to this extent is to be determined by the courts, as there is dispute concerning the assessment for paving at street intersections. It may be, therefore, that the village has no bonded indebtedness at all.

Assuming, however, that the indebtedness is 1.7 per cent or $4,340, it would be possible without exceeding the provisions of the Longworth Act to spend nearly $17,000, and under the Bense Act 5 per cent additional, or $13,000, could be spent; thus giving a total of $30,000, which would be sufficient to make the necessary improvements.

SUMMARY.

The sewers of Elmore are unsuited for sanitary purposes unless a public water supply is installed. The discharge of sewage into the Portage River has the effect of badly polluting that stream and interfering with the health and comfort of those living near its banks or passing across the stream.

With the exception of the Toledo Street sewer, all of the sewers in Elmore have been built illegally in that plans therefor have never been submitted to the State Board of Health for approval.

As a solution of the problem, an intercepting sewer should be built from Ottawa Street eastward to a point below the cemetery, and the sewage there purified.

There is now before the Board a report on a "proposed sewer" (which has just been completed) in Cheapside Street. It would be desirable to give the local officials time to conform to the action of the Board on this last proposition before action is taken under the Bense Act.

REPORT ON INVESTIGATION OF THE POLLUTION OF JENNINGS CREEK BY THE SEWAGE OF DELPHOS.

The following petition was received from Mr. Ferd Heising, clerk of Ft. Jennings, Putnam County, on October 5, 1908:

To the Ohio State Board of Health:

I, the undersigned, clerk of the village of Ft. Jennings, Putnam County, State of Ohio, do hereby certify that the council of said village, being in session on the 3rd day of October, 1908, adopted a resolution of which the following is a true copy:

"RESOLVED, That the village of Delphos, located in Allen and Van Wert counties, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Jennings Creek and Auglaize River, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Ft. Jennings, Putnam County, Ohio, who reside in the vicinity of said stream.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Delphos to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."

(Signed) FERD HEISING,
Clerk Ft. Jennings Corporation, Putnam County, Ohio.

Dated at Ft. Jennings, Ohio, this 3rd day of October, 1908.

A similar petition was received from Mr. Heising as clerk of Jennings Township, Putnam County.

These petitions were referred to a committee consisting of Dr. W. C. Chapman and the chief engineer. The committee visited the village of Delphos and Jennings Township on November 5, 1908, and submitted the following report:

Delphos is a village of about 5,000 inhabitants, located between two small streams, Jennings Creek and Flatrock Creek, which unite at a point just north of the village and form a stream which five miles farther north discharges into the Auglaize River. The Miami and Erie Canal passes through the center of the village, forming a divide. This canal is provided with a waste weir over which it flows into Jennings Creek at a point just north of the town.

In 1903 plans for a sewerage system and sewage disposal plant for Delphos were prepared by The Riggs and Sherman Company of Toledo, consulting engineers, and were submitted to and received the approval of the State Board of Health. These plans were never carried out.

During the following year, 1904, Mr. G. L. McKibben of Van Wert, consulting engineer, submitted plans for sewerage, but not sewage purification, excepting a settling basin or tank. The Board approved, July 25, 1904:

1st. The construction and use of the combined sewers with the understanding that all connections for domestic sewage be removed from them as soon as it is found that the discharge of such sewage through the sewers causes a nuisance, either on account of odors arising through catch-basins in the streets, or on account of pollution of the stream caused by the impracticability of purifying such sewage when combined with storm water.

2nd. The discharge of the dry weather sewage into Jennings Creek near the northerly limits of the corporation, after such sewage has first been passed through a sedimentation tank holding 15,000 gallons, until such time as the State Board of Health deems thorough purification necessary, and

3rd. The storm water system and outlet into Jennings Creek for the Third Ward District.

In July 1906, the assistant engineer of the Board made an inspection of the pollution of Jennings Creek in answer to a complaint from the health office of Jennings Township. It was found that the sewerage system had been constructed in part and that the condition of approval as regards the treatment of the domestic sewage in a sedimentation tank was being fulfilled. The effluent from the tank, however, though fairly free from suspended matter, was such as to cause considerable discoloration of the water in the stream. It was also observed for a distance of

500 or 600 feet below the outlet that a rather thick deposit of black putrescible matter was formed in the bed of the stream, pieces of which broke loose from time to time and floated on the surface of the water.

The principal cause of complaint at the time of the inspection in 1906 was the discharge of strawboard waste through a storm sewer into the creek. This waste discolored the whole stream, probably killed fish, and undoubtedly was carried as far as Ft. Jennings, five miles below.

At the time of the inspection of the committee on November 5,1908, the stream was inspected from the outlet of the sewage settling basin to a point in Jennings Township. It was found that the strawboard factory was discharging its waste into the canal and that this had the effect of discoloring the canal water. As there was some leakage through the aqueduct at the point where the canal crosses Jennings Creek north of the city some of the strawboard waste may find its way into Jennings Creek in this manner. The amount, however, reaching the creek in this way would be small. The evidence obtained as to the occasional discharge of strawboard waste directly into the creek was contradictory.

The effluent from the sewage settling basins was reddish brown, due probably to the discharge into the sewers of acid iron wastes from the can factory of the Delphos Manufacturing Company. In addition to the discoloration of the water by these acid iron wastes, evidences of sewage could be detected, and the stream as a whole was foul compared to its condition just above the sewer outlet. The stream retained this appearance to a point well north of the village.

From the best available information, there are at present about 200 closets connected with the sewers, which represent probably some 1,200 people. The principal contributor to the sewers is the Delphos Manufacturing Company, where large amounts of acid are said to be used in the galvanizing plant. This plant was inspected and the manufacturing process looked into. Sheets of metal are placed in tanks containing sulphuric acid and are then rinsed off in tanks of water. The latter tanks soon become full of the iron scale and acid. In addition, there is a galvanizing process in which hydrochloric acid is used. The wastes from all of the tanks are discharged into the sewers. Further investigation of the wastes from this factory should be made with reference to preventing the discharge into the sewers of such material as is detrimental to sewage purification process.

A map showing the construction of the sewers up to the present time is on file in the office of the State Board of Health. The former consulting engineer together with one of the members of the "sanitary board" claim that the objectionable condition of the creek is occasioned by failure to clean out the settling basin. It is doubtful, however, whether the cleaning of the basin would give more than a very temporary relief.

In view of the fact that in 1904 the installation of sewerage at

Delphos was approved "until such time as the State Board of Health deems thorough purification necessary," it is believed that the time has arrived when a purification plant capable of producing a well purified sewage should be installed.

A statement as to the financial resources of the village, obtained through the health officer, gives the following: Total tax duplicate for 1908, $1,356,000; total indebtedness, exclusive of special assessments, $91,000. From this it will be seen that the indebtedness now reaches 6.7 per cent. It would be possible to raise, therefore, 1.3 per cent, or $17,600, without exceeding the debt limit under the Longworth Act. Furthermore, as some of the above indebtedness has been incurred since the passage of the Longworth Act, a large amount could probably be raised. Ten thousand dollars or less would be sufficient to remedy the conditions complained of. It appears, therefore, that the financial condition of the village is such as to readily permit of raising funds to install means for satisfactorily purifying the sewage at all times.

RECOMMENDATIONS.

It is recommended that the city of Delphos, in view of the conditions under which the existing sewerage system was approved, be directed to install before July 1, 1909, sewage purification works of a design satisfactory to the State Board of Health.

It is further recommended that the village take steps to prohibit the discharge of acid iron wastes or other material into the sewers in such quantities as to interfere with the usual processes of sewage purification. Advice as to how to treat acid iron wastes may be obtained from the State Board of Health.

REPORT ON INVESTIGATION OF THE POLLUTION OF WILLS CREEK BY THE SEWAGE OF CAMBRIDGE.

On October 10th, 1908, the following petition was received from Mr. W. T. Young, clerk of Cambridge Township, Guernsey County:

To the State Board of Health:

I, the undersigned, clerk of Cambridge Township, Guernsey County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 9th day of October, 1908, adopted a resolution, of which the following is a true copy:

"RESOLVED, That the city of Cambridge, located in Guernsey County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Wills Creek, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Cambridge Township, Guernsey County, Ohio, who reside in the vicinity of said Wills Creek.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Cambridge to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."

(Signed) W. T. YOUNG.
Clerk Cambridge Township, Guernsey County, Ohio.

Dated at Cambridge, Ohio, this 9th day of October, 1908.

In addition, complaint was made by the health officer of Cambridge on behalf of citizens of the city itself who were being damaged by the existing conditions.

On October 12, 1908, the then president of the State Board of Health appointed as a committee to investigate the conditions complained of Dr. J. C. Crossland and the chief engineer. This committee visited Cambridge on October 21, 1908, and submitted the following report:

The city of Cambridge having an estimated population of nearly 10,000 and an area of about 1.3 square miles, is located in Guernsey County on Wills Creek, a tributary of the Muskingum River. The public water supply is taken from Wills Creek just above the mouth of Leatherwood Creek.

The construction of a sewerage system was commenced in 1899. Plans for sewerage were submitted to the State Board of Health in 1897, but no definite action was ever taken upon them. The sewers are on the separate plan. At the present time there are 14 miles of sanitary sewers which have some 1,200 taps. Estimating five persons to each tap, the total number using the sewers would be 6,000. This shows a remarkable increase over the number using the sewers some three years ago, which was then estimated at about 1,000. The sewage discharges through one main outlet into Wills Creek northwest of the city. It discharges through a submerged iron pipe into the middle of the stream.

One-half mile or more below the sewer outlet, a dam has been constructed across the creek for the purpose of furnishing a water supply for the Cambridge plant of the American Sheet Steel Company, which plant at the time of inspection was not in operation. This dam serves to impound the water from one to two miles upstream. The sewer outlet, therefore, discharges into slack water. Between the sewer outlet and the dam there are at least one dozen houses within a few hundred feet of the stream, and not far from this portion of the stream is a fairly well built up section of the city of Cambridge.

At the time of inspection, the discharge of the creek was very small, so that the velocity of flow in the impounded portion was practically nothing. Immediately surrounding the outlet was a seething mass of sludge some 15 feet in diameter, which extended above the surface of the water. As far as could be seen upstream and downstream in the other direction to a point below the dam, the water was black and foul smelling, showing that it consisted principally of putrefying sewage. In addition, for several hundred feet below the outlet, bubbles could be seen rising to the surface, indicating that putrefaction was taking place at the bottom of the stream. By extending a stick into the bottom of the river, foul deposits were caused to rise to the surface.

According to the statement of the city auditor, the total indebtedness of the city, exclusive of special assessments, is $369,500. Of this, $124,000 has been incurred since the passage of the Longworth Act, and $14,000 has been incurred during the year 1908. Of this last sum, $9,000 was appropriated by council without a vote of the people, and $5,000 was authorized by a vote of the people.

The total tax duplicate is $3,239,942. The total indebtedness, therefore, incurred since the passage of the Longworth Act is less than four per cent.

Sewage purification works would probably cost in the neighborhood of $60,000. From the above, it would appear that the city could raise this amount without exceeding its debt limit under the Longworth Act. On the other hand, the comparatively large amount of indebtedness incurred previous to the passage of the Longworth Act, makes the present tax rate relatively high.

As inspected on October 21, 1908, Wills Creek at and below Cambridge was found to be grossly polluted by the sewage of Cambridge. Foul and noxious odors emanated from the stream, and there were being created conditions detrimental to the health and comfort of persons residing in the vicinity.

REPORT ON INVESTIGATION OF THE POLLUTION OF BRIDGE CREEK BY SEWAGE FROM THE DARKE COUNTY INFIRMARY, GREENVILLE.

On October 15, 1908, there was received from Mr. L. E. Wills, clerk of Greenville Township, Darke County, a petition stating that the trustees of said township at a meeting held October 10, 1908, adopted the following resolution:

> RESOLVED, That the county infirmary, located in Darke County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Bridge Creek, and by reason thereof has so corrupted said Bridge Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Greenville Township, Darke County, Ohio, who reside in the vicinity of Bridge Creek.
>
> The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the Infirmary directors of Darke County to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7, 1908.

This petition was referred to the committee, consisting of Dr. Stanton, then vice-president, and the chief engineer, appointed to investigate the pollution of Greenville Creek by the sewage of Greenville. The committee investigated the conditions complained of on October 16, 1908, and submitted the following report:

The county infirmary of Darke County is located about two miles south of the city of Greenville. The buildings and grounds of the institution are well kept and afford comfortable quarters for the inmates. At the present time there are approximately 100 people, including attendants, at the infirmary.

The water supply for the institution is derived from springs and is available for all purposes throughout the buildings. It is said that the average daily consumption is about 25,000 gallons. This gives a consumption per capita per day of 250 gallons, which is probably correct on account of the large amount of water used in closets and for bathing and laundry purposes.

The main sewer from the institution discharges into Bridge Creek at a point some 800 feet west of the infirmary. Bridge Creek after passing through a farming district just beyond the corporation limits of the city of Greenville, enters Greenville Creek. It is said that the Bridge Creek water is depended upon to a considerable extent for stock watering, and on the day of inspection a large number of cattle were seen grazing in pastures through which the creek flows.

SUMMARY.

At the time of inspection, Bridge Creek was found to be grossly polluted by the sewage from the infirmary. The pollution was greatest immediately below the sewer outlet, but its effect was apparent for at least a mile below said outlet. It was clear that conditions were created detrimental to the health and comfort of those living or owning land along the creek.

As there is abundant gravel in the vicinity of the institution which would make excellent filtering material, it is believed that a sewage purification plant could be constructed at a very low cost. Steps should be taken toward installing a purification plant as soon as possible.

REPORT ON INVESTIGATION OF THE POLLUTION OF CHIPPEWA CREEK BY WASTES FROM THE OHIO BOXBOARD COMPANY AT RITTMAN.

On October 19, 1908, a petition was received from Mr. Jos. Merkt, clerk of Chippewa Township, Wayne County, reading as follows:

To the Ohio State Board of Health:

I, the undersigned, clerk of Chippewa Township, Wayne County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 17th day of October, 1908, adopted a resolution, of which the following is a true copy:

RESOLVED, That the Ohio Boxboard Company, of Rittman, located in Wayne County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Chippewa Creek, and by reason thereof has so corrupted said Chippewa Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Chippewa Township, Wayne County, Ohio, who reside in the vicinity of said Chippewa Creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said Ohio Boxboard Company, of Rittman, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7, 1908.

(Signed) JOS. MERKT,
Clerk Chippewa Township, Wayne County, Ohio.

Dated at Doylestown, Ohio, this 17th day of October, 1908.

The president of the Board on October 21, 1908, appointed a committee consisting of Mr. Josiah Hartzell and the chief engineer, to investigate the complaint. On October 28, 1908, one of the members of this committee visited Rittman and investigated the conditions complained of. The following report was submitted:

The Ohio Boxboard Company maintains a plant near the easterly boundaries of the village of Rittman, at which plant there is daily made into boxboard some 50 tons of paper stock. This paper stock consists of newspaper and a mixture of waste paper such as is gathered from houses and stores. The paper stock is first dissolved in clean well water and then there is added to it daily some 200 pounds of dyes, 300 pounds of alum, and 300 pounds of sizing. The last is made from rosin cut with caustic soda. The total quantity of water used, which also represents the total output of waste liquid, is about 1,500,000 gallons per day.

Most of the colors and chemicals probably remain in the fiber of the paper, but nevertheless the waste water as it issues from the mill contains dirt, impurities, paper fiber, as well as considerable coloring matter, as is shown by its appearance.

The discharge from the mill passes into a ditch leading to the River Styx, which is a tributary of Chippewa Creek. These streams were inspected at a point immediately below the mill, at a point one-fourth mile below the mill, and at a point over one mile below the mill within the boundaries of Chippewa Township, from which the complaint comes. It was found at the last place that the water of the creek was colored a dark green and that the bottom contained offensive and putrefying deposits, which deposits at certain places rose to the surface. The odor was offensive. On crossing the creek, after dark, at a point some three miles below the mill near Easton, a disagreeable odor was detected, and inquiry among the residents of Easton, which is the center of Chippewa Township, developed the fact that the stream was considered to be very badly polluted.

The plant of the Ohio Boxboard Company, at Rittman, has been found to discharge into the River Styx and thence into Chippewa Creek. manufacturing wastes of such character and in such amount that Chippewa Creek within Chippewa Township is badly polluted, and conditions detrimental to the health and comfort of the residents of said township are thereby created.

REPORT ON INVESTIGATION OF POLLUTION OF A DITCH AT EAST ORWELL BY WASTES FROM THE OHIO AND PITTSBURG MILK COMPANY.

On October 19, 1908, there was received from Mr. Roy Peck, clerk of Orwell Township, Ashtabula County, the following petition:

> To the Ohio State Board of Health:
>
> I, the undersigned, clerk of Orwell Township, Ashtabula County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 16th day of October, 1908, adopted a resolution, of which the following is a true copy:
>
> "Resolved, That the Ohio and Pittsburg Milk Co., located in Ashtabula County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into water course, and by reason thereof has so corrupted said water course as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Orwell Township, Ashtabula County, Ohio, who reside in the vicinity of said creamery.
>
> "The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said Ohio and Pittsburg Milk Co. to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."
>
> (Signed) Roy Peck,
> Clerk Orwell Township, Ashtabula County, Ohio.
>
> Dated at East Orwell, Ohio, this 17th day of October, 1908.

A committee consisting of Dr. Darwin G. Palmer and the chief engineer, was appointed to investigate the complaint. This committee made an investigation at East Orwell on November 10, 1908, and submitted the following report:

The Ohio and Pittsburg Milk Company maintains a plant near East Orwell where a general creamery business is conducted. The cream is separated from the milk, and cheese and butter are manufactured, the products being shipped away. The washings from the milk cans are discharged into a small ditch which passes near the factory in a general northwesterly direction and finally enters a tributary of the Grand River. The volume of these washings is said by the superintendent to be equal to the contents of a tank 3 feet by 1½ feet by 4 feet; or approximately 30 gallons are discharged into the ditch each day and sometimes oftener. The outlet into the ditch is through a culvert in the main street.

The condition of the ditch on the day of inspection was very offensive both to sight and smell. The owner of the property nearest to the milk factory, through whose land the ditch passes, had a most just cause of complaint.

The matter of deepening the ditch was discussed as a remedy. This, however, would not solve the problem, as even with a more rapid flow the dairy wastes would on putrefying always cause offensive conditions.

It is believed that for a comparatively small sum the Ohio and Pittsburg Milk Company could install a tank and sand filters capable of purifying the wastes to such a degree that the resulting effluent would cause no nuisance in the ditch.

RECOMMENDATIONS.

It is recommended that a copy of this report be sent to the Ohio and Pittsburg Milk Company, with the statement that the Board would be willing to co-operate with said company in designing a plant which would satisfactorily purify the wastes and abate the nuisance complained of.

REPORT ON INVESTIGATION OF THE POLLUTION OF THE MAHONING RIVER AT ALLIANCE BY THE SEWAGE OF ALLIANCE.

On October 21, 1908, there was received from Mr. R. E. Collar, clerk of Lexington Township, Stark County, the following petition:

To the State Board of Health:

I, the undersigned, clerk of Lexington Township, Stark County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 20th day of October, 1908, adopted a resolution, of which the following is a true copy:

"RESOLVED, That the city of Alliance, located in Stark County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into the Mahoning River, and by reason thereof has so corrupted said river as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Lexington Township, Stark County, Ohio, who reside in the vicinity of said river.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Alliance to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."

(Signed) R. E. COLLAR,
Clerk Lexington Township, Stark County, Ohio.

Dated at Alliance, Ohio, this 20th day of October, 1908.

The above petition was referred to a committee consisting of Mr. Josiah Hartzell and the chief engineer. This committee visited Alliance on October 29, 1908, and investigated the conditions complained of. The following report was submitted:

The city of Alliance is in Stark County on the Mahoning River, at a point where the stream has a watershed of about 73 square miles. It has a population of 14,000, as estimated from the census reports. The city is a large manufacturing center, the principal industries of which comprise the manufacture of machinery and heavy iron goods. A number of municipal improvements have been carried out dating from 1883, when a public water supply was installed, water for which was taken from the Mahoning River. According to the reports of the water department, the present average daily consumption is about 3,750,000 gallons.

The construction of the general system of sanitary sewers now in use was begun in the year 1896. The sewers are of vitrified pipe ranging from 6 to 8 inches in diameter. There are now nearly 35 miles of sanitary sewers which are used by 6,500 persons. Storm water connections with the sewers are forbidden; nevertheless, the flow of sewage increases somewhat during wet weather. The average dry weather flow is about 1,600,000 gallons per day.

A sewage purification plant, on the chemical precipitation plan, was installed in 1896 at the time the first sewers were built. The plant is located on a small strip of land in the southerly part of the city adjacent to the built up portion, the nearest house being only 200 feet distant. The plant is described in the annual report of the State Board of Health for 1903, and a more complete description will shortly appear in the forthcoming special report on water and sewage purification plants in Ohio.

In brief, the works consist of a two-story brick building, approximately 60 feet by 30 feet, the upper story of which contains the chemical mixing apparatus. On the lower floor is a 40 horse power boiler which furnishes steam for operating the mixing tanks and pumps. Passing between the lower floor is the main sewer, which at this point receives the lime or other chemicals.

Adjacent to the building are three precipitation tanks, each 40 feet by 80 feet by 6 feet deep, having a total capacity of 420,000 gallons. At the entrance of each is a screen which retains the heavier suspended matter in the sewage.

The plant is equipped with a sludge well into which the precipitation tanks can be drained; there are also sludge pressing devices. The accumulation of pressed sludge is one of the most notable features of the plant. As the demand for this sludge for fertilizing purposes is limited, it accumulates faster than the farmers will haul it away.

For a few months previous to the date of the committee's inspection, no chemicals had been used and the precipitation tanks were being operated as septic tanks. The accumulation of sludge during operation under this method was surprisingly small, and the effluent appeared to be practically as good as that from the chemical precipitation process; although no analyses were made.

The Alliance sewage plant during the first years of its operation was fairly efficient and prevented the creation of objectionable conditions in the Mahoning River. The quantity of sewage increased rapidly, however, and as early as 1903 the plant showed signs of being outgrown. When visited in September, 1904, the plant was doing very poor work, and numerous complaints were heard on account of the polluted condition of the stream and because of the odors arising from the plant itself. At that time the waste liquors from the gas works were said to be partially responsible for the failure to obtain better results in purifying the sewage.

During the special investigation of the State Board of Health on water and sewage purification in Ohio (1906 and 1907), the plant was visited five times by one of the assistant engineers and full data regarding the plant as well as the pollution of the river were collected. In general, the information obtained during this investigation showed very poor efficiency on the part of the plant, even when considerable amounts of lime were being used. The analyses of samples of crude sewage and effluent collected in August, 1906, showed a removal of suspended matter of only 50 per cent., while the dissolved organic matter was considerably higher than that in the crude sewage. The treated effluent at this examination was distinctly putrescible and large masses of putrefying sludge were noted along the banks of the river below the discharge of the effluent from the plant. The general conclusion drawn during the special investigation was that lime treatment at Alliance tended to make the effluent more offensive than would be the case if the sewage were treated by sedimentation only. Furthermore, the odors from the plant itself were objectionable, especially on account of its close proximity to the inhabited portion of the city.

In 1907, on account of numerous and urgent complaints from riparian owners along the stream below the sewage plant, a 24-inch main sewer was constructed, without the consent of the State Board of Health, and the effluent from the sewage plant was conveyed to a point 2,600 feet below the original outlet.

During the summer of 1908, the State Board of Health commenced a series of investigations of the Mahoning River and tributaries, extending from a point above Alliance to a point below Youngstown. The investigation has for its purposes the securing of information as to the extent to which the Mahoning River is polluted below the various communities situated thereon, and the tracing of such pollution downstream with reference to its effect upon the water supplies of other communities. During the last six months, therefore, studies of the stream flow have been made and samples have been collected for analysis above and below Alliance. The condition of the stream has been inspected by the assistant engineers on the following dates: June 15-16; July 13-16; August 27; and September 28-29. For a distance of at least 1,000 feet below the outlet, black deposits of sludge were found in the bottom of the stream, at least six inches deep. Decomposition was indicated by ebullition of gas.

These investigations invariably showed that the Mahoning River, in Lexington Township, below the present main sewer outlet, was in a very foul and offensive condition. In September, 1908, this contamination was distinctly visible for four miles below the outlet and by analyses could be traced six miles farther downstream.

At the time of investigation by the committee, October 29, 1908, the flow of the river was very small. The sewage plant was visited and was found to be operating on the septic tank process, as above mentioned. The river above and below the main outlet was carefully inspected. Below the outlet the water was black and foul and gave forth offensive odors.

According to the statement of the city auditor, the total tax duplicate for 1908 is $5,083,030. The total bonded indebtedness exclusive of special assessments is $545,750, of which $100,650 was incurred previous to the passage of the Longworth Act in 1902. It will be seen from the above that the city is at present in debt up to the legal limit and could not, therefore, issue bonds for a sewage purification plant unless ordered to do so under the Bense Act, by the State Board of Health with the consent of the governor and attorney general.

The officials of Alliance realize the great necessity for properly purifying the sewage and ceasing to contaminate the stream, and appear to be willing to proceed with the installation of an adequate sewage purification plant if the State Board of Health orders them so to do, under the Bense Act, and thus make it possible for them to raise the necessary funds.

The sewage purification plant at Alliance is entirely inadequate to satisfactorily purify the quantity of sewage which it now must receive. The water of the Mahoning River, therefore, below the main outlet, is very offensive and causes conditions detrimental to the health of the people living near the stream and having occasion to pass across it.

The need for a sewage purification plant constructed along modern lines, to provide for the satisfactory purification of all the sewage of the city, is very great at the present time, and the installation of such a plant should be begun at once.

ORDER OF THE BOARD.

The following order to the Mayor and Council and the Board of Public Service of Alliance, was issued January 4th, 1909.

Whereas, The State Board of Health of the State of Ohio, having under consideration the conditions existing in and adjacent to the city of Alliance, Stark County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the trustees of Lexington Township Stark County, as required by Section 1 of an act of the General Assembly of Ohio, entitled. "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 8th, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating conditions complained of, found that the said city of Alliance, Stark County, Ohio, is discharging and permitting to be discharged sewage and other wastes into the Mahoning River, and by reason thereof has so corrupted said river as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Lexington Township, Stark County, who reside in the vicinity of said river, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 4th day of December, 1908, notified such city so causing the contamination or pollution of such stream, of its said findings, and gave said city an opportunity to be heard before said Board, and

WHEREAS, On the 9th day of December, 1908, pursuant to said notice, there appeared before the State Board of Health Mr. John J. Brown, city solicitor, representing said city, and the matters as contained in said complaint were then discussed and argued by him in the presence of said Board, and

THEREUPON, After such hearing and argument, the State Board of Health does find and determine that the following improvements or changes in said conditions aforesaid are necessary, and should be made, towit: That the city of Alliance should be required to purify its sewage in a manner satisfactory to the State Board of Health on or before December 1, 1909.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health are hereby ordered transmitted to the Governor and Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

C. O. PROBST,
Secretary of the State Board of Health of the State of Ohio.

Columbus, Ohio, December 31st, 1909.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 4th day of January, 1909.

A. L. HARRIS,
Governor of Ohio.
U. G. DENMAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF THE POLLUTION OF MILL CREEK, A TRIBUTARY OF THE SCIOTO RIVER, BY THE SEWAGE OF MARYSVILLE.

On October 22, 1908, there was received from Mr. John W. Keegan, clerk of the board of Health of Columbus, the following petition:

To the Ohio State Board of Health:

I, the undersigned, clerk of the Board of Health of the city of Columbus, Franklin County, State of Ohio, do hereby certify that the Board of Health of said city, being in session on the 20th day of October, 1908, adopted a resolution, of which the following is a true copy:

"RESOLVED, That the village of Marysville, located in Union County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Mill Creek, a tributary of the Scioto River, and by reason thereof has so corrupted said Scioto River as to pollute the source of the public water supply of Columbus, thereby creating conditions that are detrimental to the health and comfort of the citizens of Columbus, Franklin County, Ohio.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Marysville to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board; in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7,1908."

(Signed) JOHN W. KEEGAN,
Clerk Board of Health, Columbus, Ohio.

Dated at Columbus, Ohio, this 21st day of October, 1908.

The president of the Board on October 23, 1908, appointed the following committee to investigate the matter and report thereon: Dr. Frank Warner, the secretary and the chief engineer. On November 22, 1908, Dr. Warner visited Marysville, and on November 25, 1908, the secretary and the chief engineer made an inspection and discussed with the mayor and council of the village all phases of the situation. The following report is herewith submitted:

Marysville is the county seat of Union County and is situated on Mill Creek, a tributary of the Scioto River. The present population is estimated at about 4,000. The area within the corporation limits is nearly 1½ square miles. The topography of the village as well as the surrounding country is comparatively level.

The water works were installed in 1890 and are operated by a private company under a thirty-year franchise. The supply is derived from deep wells, which though organically safe, contain mineral matters in considerable quantities. The vital statistics for Marysville are incomplete; but those available, which cover a period of seven years previous to 1900, show considerable typhoid fever.

The village has no system of sewers, but sewage from a considerable number of houses, estimated at from 100 to 200, including cesspool overflows, is discharged through storm sewers and through private drains into Town Run. This run is primarily a natural water course and has been shaped into a ditch to drain the wastes of the village.

Town Run has been a decided nuisance for many years and is receiving more and more sewage as time goes on. The occupants of houses and shops along its course are generally indignant that such conditions are allowed to exist.

Several attempts have been made to install proper sewerage, but all have been unsuccessful on account of local antagonisms. Instead of installing sewers, the available funds have been spent for street paving. The State Board of Health has already advised the village regarding sewerage as follows:

October 11, 1894, upon Dr. Probst's report that, "Your [local board of health] board should, therefore, urge upon council and upon your citizens the necessity of sewers. You should also condemn the run [Town Run mentioned below] as a nuisance; and if sewerage is not provided, should take steps to lessen the nuisance as much as possible in some other manner."

One year later, October 9, 1895, the Board approved plans for sewerage which provided for discharge of sewage into Mill Creek, stipulating, however, that the channel of the run should be deepened and weeds cleared away near the outlet. It also strongly recommended the purchase of lands for disposal purposes.

At the time of inspection there was no flow in the ditch above the village, but near the point where it enters the corporation limits the run receives water in considerable quantities from a milk condensing factory. This water was discolored by washings from the cans and utensils used in the manufacture of condensed milk. Following down the stream through the village an increasing discharge of sewage was noted, which resulted in bad odors and general offensive conditions.

At the meeting of council at the time of the recent inspection, the members individually expressed themselves as realizing the necessity for improved sewerage and sewage purification, and were in favor of taking steps toward installing purification works. It was feared, however, that if council took the initiative, thus necessitating a vote of the people, the project might not be successful. The councilmen therefore believe that if the village were ordered to proceed under the Bense Act the desired end would be accomplished.

In order to investigate the effect of the sewage of Marysville upon the water supply of Columbus, there were collected samples of water from the following points: Mill Creek above Marysville; Town Creek at mouth; Mill Creek 1½ miles below Marysville; Mill Creek at mouth; Scioto River above entrance of Mill Creek; Scioto River below entrance of Mill Creek. The dissolved oxygen determinations on these samples were started in the field and the samples all reached the laboratory within a few hours of time of collection, and analyses were immediately begun.

The result of the analyses show that the stream was very badly polluted at a point about a mile below Marysville. Although these evidences of pollution on the day of the examination had very largely disappeared by the time Mill Creek entered the Scioto River, nevertheless the samples were taken at a time when conditions were unusually favorable toward the self-purification of the stream. During a rise in the river following a dry period the pollution could undoubtedly be traced by analytical methods to the Columbus water supply.

Aside from the analytical data, it is well known that the typhoid germ can be carried for many miles downstream. Instances where water supplies have been infected from pollution sixty miles above are known. The relatively swift current of Mill Creek and the Scioto River above the storage reservoir would tend to bring the pollution quickly from Marysville to the Columbus storage reservoir. There is always, therefore, the danger of infection, especially when there is considerable typhoid at Marysville. This danger is greater than can be shown by analytical methods.

Moreover, Mill Creek for several miles below Marysville is in a badly polluted condition, and the bed of the stream contains offensive deposits.

This condition of the stream is detrimental to the health and comfort of the residents of Paris Township living along the stream below the village.

A statement obtained from the village clerk of Marysville gives the following information in regard to the financial condition of the village: Total tax duplicate for 1908, $1,396,640; total indebtedness, exclusive of special assessments, $60,959; amount of indebtedness incurred previous to the passage of the Longworth Act, exclusive of special assessments, $14,000. It will be noted from the above that the bonded indebtedness of the village under the Longworth Act is only one per cent. of the total tax duplicate. Without exceeding the debt limit under the Longworth Act, therefore, seven per cent. more, or nearly $100,000, could be raised. As the necessary improvements, at least for present installation, would cost less than half this amount, it would seem that the financial condition of the village is such as to readily permit of raising the necessary money.

SUMMARY.

The village of Marysville is discharging sewage into Town Run with the effect that the run itself in the village is in a very offensive condition, and Mill Creek, into which the run empties, is also badly polluted for several miles below Marysville, thus creating conditions detrimental to the health and comfort of those living in the village as well as below the village. In addition, the discharge of sewage from Marysville in this manner is a probable menace to the water supply of Columbus.

In order to improve conditions, both from the standpoint of the creation of gross pollution in Town Run at Marysville and Mill Creek below Marysville, and also from the standpoint of the pollution of the Columbus watersupply, there should be installed at Marysville a system of sewers and sewage purification works capable of purifying the sewage to a high degree.

REPORT ON INVESTIGATION OF THE POLLUTION OF THE GREAT MIAMI RIVER AT MIAMISBURG BY SEWAGE FROM THE NATIONAL MILITARY HOME, DAYTON.

On November 7, 1908, there was received from Mr. Chas. F. Eck, village clerk of Miamisburg, the following petition:

To the Ohio State Board of Health:

I, the undersigned, clerk of the council of the village of Miamisburg, Montgomery County, State of Ohio, do hereby certify that the council of said village, being in session on the 4th day of November, 1908, adopted a resolution, of which the following is a true copy:

"RESOLVED, That the National Military Home, located in Montgomery County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Great Miami River, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Miamisburg, Montgomery County, Ohio, who reside in the vicinity of said stream.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said National Military Home to install such works or means for purifying or otherwise disposing of its sewage and other wastes, as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908."

(Signed) CHAS. F. ECK,
Village Clerk, Miamisburg, Ohio.

Dated at Miamisburg, Ohio, this 4th day of November, 1908.

A committee consisting of the president, the secretary and the chief engineer of the Board was appointed November 11, 1908, to investigate the conditions complained of. Two of the members of this committee visited Miamisburg on November 20, 1908, and met four members of of the council, who explained in full their reasons for the complaint. The following report was submitted:

The village of Miamisburg, Montgomery County, has a population of approximately 4,500. It is located on the Great Miami River about ten miles below Dayton, the greater portion of the village lying between the Miami Canal and the river. Much of the land along the valley in the neighborhood of Miamisburg is underlaid by extensive deposits of gravel which contain abundant supplies of ground water. Miamisburg secures its public supply from such a source.

Miamisburg has no system of sanitary sewers, although there are a few storm sewers, built without the approval of the State Board of Health, which probably carry some domestic wastes.

From the statements of members of council, as well as other persons interviewed, it appears that the condition of the Great Miami River at Miamisburg is becoming more and more objectionable from year to year, especially with the low stages of the stream. Fish no longer exist in large numbers, as was formerly the case, and the water is not considered fit for bathing. Of course, it is unfit for drinking purposes, also, but there is generally no reason for drinking the river water when ground water is so abundant.

The deterioration of the river is attributed by the Miamisburg officials to the sewage from the city of Dayton and from the Soldiers' Home just below Dayton. Mention was made of the discharge of industrial wastes, although as much stress was not laid on this feature as was warranted in view of the investigation of the committee, discussed below. As will be noted, the resolution passed by the council complains specifically of the Soldiers' Home, and makes no mention of the much larger volume of sewage coming from the city of Dayton. Inquiry as to the reason for this developed the fact that the majority of council felt that the Soldiers' Home, being operated by the federal government, should install a sewage purification plant as an example to Dayton and other places. No claim was made that the Soldiers' Home sewage could be distinguished separately from other contamination in the river at Miamisburg. Furthermore, council was not unanimous in voting to complain against the Soldiers' Home alone, as several of the members considered that the complaint should also include the city of Dayton.

At the time of the inspection the river water, as well as the water in the canal at Miamisburg, was colored dark brown and contained a considerable quantity of fine suspended matter. An odor of some sulphur compound was distinctly detectable. The bed of the river was covered with a slimy deposit.

With a view to detecting the source of this contamination, the committee inspected the paper mills at and above Miamisburg. Just above the village are located the Miamisburg Paper Company and the Ohio Paper Company. At the former plant, it is said, nothing but bleached stock is used. No chemicals, therefore, are necessary for use at this plant. The waste consists simply of the drainage from the paper machine, which is probably clean water containing small amounts of paper fiber.

At the Ohio Paper Company, roofing felt is made. The stock consists of dirty rags. These rags are placed in the beaters and made into pulp. No chemicals are used in the process, as it is not necessary to obtain a white paper. The waste at this mill consists of the water from the machine, amounting to possibly 20,000 gallons per day. This water is very dirty, on account of the filthy condition of the stock from which the paper is made. The quantity, however, would not account for the deposits in the river, and the color was quite different from the color of the river.

Passing upstream about two miles to West Carrollton, the large plant of the Friend Paper Company was inspected. At this plant wood pulp is made by the sulphite process, and this pulp is manufactured into paper at the same plant. Some fifty tons of pulp made from cypress, hemlock, cottonwood and willow are manufactured daily. The pulp is made by digesting the wood with sulphur and lime. From this is made some seventy tons of paper. About 1,100 gallons of melted sulphur and 240 pounds of lime are necessary for each ton of pulp. The waste product from this pulp manufacturing process consists of a heavy looking dark brown liquor, which at the time of inspection was entering the canal in considerable quantities, and undoubtedly accounted for the objectionable condition of the river as well as of the canal at Miamisburg, since the canal water enters the river at two or three different points between West Carrollton and Miamisburg.

The canal and river above West Carrollton, although not perhaps as clean looking as an entirely unpolluted stream, were quite different in appearance from the canal and river at Miamisburg. Above West Carrollton the river, judging from sight and smell, at the time of inspection would not be classed as a polluted stream.

The refuse above described from the Friend Paper Company contains nothing, except the sewage of the employes, which could be the direct cause of disease. It is said by the superintendent of the mill that the brownish color of the waste water is due to a tannic acid derived from the wood. This gives off a sulphurous odor, which undoubtedly accounted for the odor in the river at Miamisburg. The sediment which accompanies the sulphite waste as well as that incidental to the manufacture and bleaching of paper at the same plant, probably produces the objectionable conditions in the river and river bed at Miamisburg.

SUMMARY.

The complaint of the village council of Miamisburg against the Soldiers' Home at Dayton, exclusive of other sources of contamination of the river, under the Bense Act, is not justified in view of the information obtained by the committee.

The river three miles above Miamisburg, before the entrance of the paper mill wastes, was not objectionable at the time of the inspection, although according to the statements of old inhabitants the water is never as clean as it was some years ago.

The objectionable conditions of the river and canal at Miamisburg is due principally to the wastes from the Friend Paper Company at West Carrollton, and is possibly increased to a slight degree by the wastes from the mill of the Ohio Paper Company at Miamisburg.

MISCELLANEOUS REPORTS

REPORT ON INVESTIGATION OF NUISANCE IN ROCKY RIVER, ROCKY RIVER VILLAGE, CUYAHOGA COUNTY.

On September 20, 1908, a communication was received from Mr. Franklyn A. Rice, health officer of Rocky River, calling the attention of the Board to a nuisance at Rocky River alleged to be due to the sewage of the village of Lakewood. It was stated that the river was practically dry, and that due to the direct discharge of the Lakewood sewage, the inefficiency of the sewage treatment plant or poor operation of the same, foul odors were emanating from the bed of Rocky River, to the detriment of the health and comfort of the citizens of Rocky River village. It was further alleged that the sewage was polluting the public water supply of Rocky River. It was also stated that conditions were aggravated by operations incidental to cleaning the septic tanks.

This communication was considered by the Board at its meeting held September 23, 1908. Doctor Miller was appointed a committee of one to make an investigation with the assistance of one of the assistant engineers.

Doctor Miller, member of the State Board of Health, and one of the assistant engineers visited Lakewood and Rocky River on September 30, 1908, and made an investigation of the conditions alleged to be detrimental to the health and comfort of the latter village, in company with Mayor Mitchell of Rocky River. The committee submits the following report:

Before discussing present conditions at Rocky River and facts bearing directly on the alleged nuisance, it is advisable to refer briefly to certain points which have brought about the present polluted condition of Rocky River due to the Lakewood sewage. For the sake of clearness the discussion is preceded by a brief description of the Lakewood sewage purification plant.

BRIEF DISCUSSION OF LAKEWOOD SEWERAGE SYSTEM AND SEWAGE PURIFICATION PLANT.

The village of Lakewood is on the shore of Lake Erie, about five miles west of the city of Cleveland, and embraces an area of about three square miles. Local estimates place the population at 10,000. Village improvements have been extensively carried out, including street paving, the construction of a sewerage system and the installation of a public water supply.

SEWERAGE SYSTEM.

The sewerage system was begun about 1900. At the end of 1907 the sanitary sewers comprised 34 miles of pipe sewers and 20 miles of storm sewers. All of the older sewers are underdrained and are on the separate system.

To prevent the pollution of the shore of Lake Erie it was necessary to provide for sewage purification. For this purpose local topography allowed the concentration of almost all of the sanitary sewage of the village at one point—namely, on low land near Rocky River at the easterly part of the village. While the majority of the sewage of the village can be collected at this point, there is a narrow strip of land on the lake front so situated that sewage cannot flow to the sewage purification plant, and under present conditions considerable crude sewage discharges into the lake from residences on this somewhat small area.

INVERTED SIPHON.

To provide for sewage purification it was found necessary to construct a tunnel in the southerly part of the village. At the outlet of this tunnel the crude sewage is caused to enter an inverted siphon which terminates at a sewage purification plant. This siphon is about 1,165 feet long and is constructed of 10-inch iron pipe. A blow-off is provided at the low point in the siphon. At the inlet chamber leading to the siphon the 10-inch pipe is blocked off by a brick wall to reduce eddies and to cause a clear entrance into the siphon. In this chamber there is also an intercepting wall which contains three rows of 4-inch pipe placed 9 inches on centers and surrounded by concrete. This construction practically serves as a screen to prevent the clogging of the siphon by coarse objects carried by the sewage. From this chamber also there is an overflow or by-pass which comes into action during heavy storms or in case the screen wall becomes clogged.

SEWAGE PURIFICATION PLANT.

The Lakewood sewage purification plant is on a 10-acre tract of land in the extreme southern part of the village and bordering on Rocky River. The site is well removed from dwellings, and the nearest house, which is perhaps one-quarter of a mile distant, is situated on a bluff in the village proper. The treatment of the Lakewood sewage is carried out in septic tanks and contact filters.

SEPTIC TANKS.—The septic tanks are two in number, and are each 36 feet 4 inches by 74 feet 4 inches in plan and 11 feet deep. The tanks are covered. The depth to the flow line is 9 feet 9 inches. The average capacity of each tank is 150,000 gallons.

Sewage from the inverted siphon enters an inlet chamber at one corner of the tanks. From this chamber it flows through a 12-inch pipe. At two points on the respective center lines of the two tanks there branch 8-inch pipes, flow through which is controlled by 8-inch valves. From these pipes there again branch three 6-inch pipes, which are the actual inlets of the sewage into each septic tank. By this arrangement of valves it is possible to shut off one tank completely.

Other details of the tanks of interest relative to the present discussion, is the sludge drain which is located at the outlet end of the two tanks. It consists of a 12-inch drain controlled by a sluice gate, one for each filter leading to a common blow-off chamber. By this means the upper six feet of sewage in the tanks may be drained off.

The crude sewage may be by-passed directly into the river at the inlet chamber, and also at a blow-off manhole on the inverted siphon. The septic sewage may be discharged directly into the river at the foot of the aerating channel which follows the septic tanks. Crude sewage may also reach the river, as before stated, in case the entrance to the inverted siphon is clogged, as is probably the case after heavy rains.

CONTACT FILTERS.—The contact filters comprise five units, each with an area of 0.125 acre. They are constructed of cinders from 1-8 to 1½ inches in diameter and 5 feet deep. The filters are operated on the fill-and-draw plan by means of an automatic device. On this account the plant ordinarily requires very little attention.

REVIEW OF EFFICIENCY UNDER SPECIAL INVESTIGATION.

During the special investigation of sewage purification plants carried out by the Board during 1906 and 1907, six visits were made to Lakewood plant. Detailed examinations were made on June 12-14, 1906, and June 12-13, 1907. These two examinations and inspections made during the investigation served to bring out a number of points relative to the Lakewood plant and its efficiency. The general results of the investigation show that the sewage of Lakewood is being purified to a very satisfactory degree. The septic tanks up to the fall of 1908 had never been cleaned, but the investigation indicated that cleaning would be necessary in the near future. The normal sewage flow has been treated at the plant without difficulty, and indications are strong that the sewage has not been discharged into the river directly except when necessary on account of the large increase in sewage flow during storms. During the investigation the average dry weather sewage flow was about 500,000 gallons. The plant has been carefully operated, and in general conditions during the special investigation were very satisfactory.

RECENT CONDITIONS.

In the middle of August, 1908, the accumulated sludge in the septic tanks began to appear in the effluent in such quantities as to make necessary the removal of the sludge from the septic tanks. The matter was taken up by the village authorities and bids were secured from several contractors for undertaking the work. The quantity of sludge was estimated by the village engineer at 500 cubic yards. The bids for its removal are said to have ranged from $0.91 to $1.05 per cubic yard.

Cleaning was stated to have been begun on August 23, 1908, and was continued until September 24, 1908.

As soon as the work of cleaning the tanks was begun, the blow-off was opened at the low point on the siphon, and from August 23 to September 24, 1908, the entire dry weather sewage of the village of Lakewood was discharged into Rocky River, practically a dry stream during this period. No attempt was made to operate one of the septic tanks while the other was being cleaned. The sludge was removed from the septic tanks in buckets, and was discharged through a trough onto low land adjacent to the tanks. The sludge was of a deep black color, but was practically without odor. It was stated to have caused no annoyance to the workmen and no nuisance in the vicinity of the plant.

During the process of cleaning of the tanks it was discovered that there was a break in one of the sanitary sewers in the tunnel. Consequently, for some time past, perhaps even prior to the by-passing of the sewage at the siphon blow-off, some sanitary crude sewage was being discharged into Rocky River.

CONDITIONS WHEN INSPECTED.

On the day of the inspection, September 30, 1908, the septic tanks had been cleaned, conditions were normal in the sense that the sewage was reaching the plant through the inverted siphon. The flow of sewage was, however, very small, since it was necessary to dam up the sewer and to divert the sewage to the river at the head of the tunnel, as repairs to the broken sewer in the tunnel were then under way. In general the plant was in good condition and the small volume of effluent flowing in the effluent sewer appeared to be satisfactorily purified. In general it is to be stated that the condition of the plant was normal, and that any criticisms relative to its operation refer specifically to conditions brought about by the cleaning of the septic tanks and not to general features of the operation of the plant.

Following the inspection of the plant, complete information was obtained from the operator relative to the cleaning of the septic tanks. It was found that the plant was by-passed for one month, as before stated, and that there was no attempt made to clean the septic tanks one at a time, since the operator was not aware of the possibility of operating the plant in this manner. At the end of the third week it was stated that one of the Rocky River officials suggested the plan of placing in service the tank already cleaned. This is stated to have been attempted. The sewage was caused to flow into the northerly tank in the late afternoon. The inlet to the southerly tank is said to have been closed. The next morning both tanks are said to have been filled with sewage to the same level. The plan was, therefore, necessarily abandoned, as it interfered with the cleaning of the second tank. It was not clear why this plan was not successful, since the design of the inlets is such as to insure flexibility in operation.

RESUME AND CONCLUSIONS.

The facts brought out by the investigation of the alleged nuisance at Rocky River, due to the discharge of the Lakewood crude sewage, are in brief as follows:

From August 23d to September 24th, 1908, the sewage of the village of Lakewood was discharged into Rocky River through the blow-off at the low point on the inverted siphon by which the village sewage is conducted to the purification plant. During this period very little water was flowing in the bed of Rocky River. The results of this discharge of crude sewage was the cause of a decided nuisance. The stream, which consisted practically of sewage, became inky black, and there accumulated masses of fermenting sludge. The sewage was by-passed in this manner for the period above stated in order that sludge might be removed from the septic tanks at the Lakewood purification plant. The operator was not aware that it is possible to clean one tank with the other tank in service, hence the plant was completely shut down. After the sewage had been by-passed for three weeks, it was stated that an attempt was made to operate one septic tank while the other was being cleaned. It is alleged that this was a failure, since that after about twelve hours sewage was found in the tank being cleaned at practically the same depth as that in the tank in service. On September 24, 1908, cleaning of the septic tanks had ceased. Conditions then became normal, except that owing to necessary repairs to the sanitary sewer at the head of the tunnel, sewage was being by-passed into the river and only a small flow reached the plant. Such was the condition on the day of the inspection. It appears that there was no complaint whatever from the discharge of sludge itself. The sludge was highly septicized and without objectionable odor.

The officials of Rocky River village complained of nuisance in the river due to odors and the foul masses of decomposing sludge. They also pointed out that their water supply was being endangered. The investigation showed that all these allegations were correct. It is unquestioned that the discharge of the Lakewood sewage without treatment for a period of one month into a practically dry stream bed caused a nuisance from odor and foul deposits. It is also clear that this practice placed an unusually heavy load on the Rocky River filtration plant. It is to be recalled in this connection that the plant, according to information obtained during the special investigation of water purification plants, cannot purify the Rocky River water to a satisfactory degree. On this account the Board has some time since advised the Rocky River Water Company to extend its intake into Lake Erie.

In conclusion it is to be stated that the Lakewood sewage purification plant is generally well operated, and produces an effluent which is very satisfactory from a chemical point of view. It appears that owing to a lack of detailed knowledge of the plant that the entire sewage flow was by-passed in order that the septic tanks could be cleaned. This condition, which lasted for one month, is the direct and sole cause of the present complaint and the foul condition of Rocky River. Such conditions as these arise from the lack of knowledge of operators as to full details of their plants, especially in the case of the larger plants. These facts emphasize the desirability of continued supervision, and also the desirability that operators be provided with full detailed drawings of their plants, with definite and complete knowledge as to the working of each and every part of the plant. Under these conditions such an unnecessary pollution of a stream as the above would not take place. These facts perhaps further suggest that it would be desirable for the Board to require all communities to notify the Board whenever it is intended to clean sludge from septic or settling tanks. Had this been done in this case, the nuisance herein described could have been prevented. The disposal of sludge is an important matter, and requires considerable care in handling in order to prevent serious pollution, which in a measure offsets benefits that have accrued from the normal operation of the purification plant.

REPORT ON INVESTIGATION OF NUISANCE AT MARION.

A communication was received from the health officer of Marion Township, Marion County, requesting an investigation by a representative of the State Board of Health relative to a nuisance created in a county drain by the discharge therein of slaughter house and brewery wastes. On July 8, 1908, one of the assistant engineers visited Marion and in company with the health officers of Marion and Marion Township and with the trustees of Marion Township, made an inspection of the conditions complained of. The following report was submitted:

A number of years ago a tile drain for effecting subsurface drainage was laid by the county commissioners. This drain extends through Marion Township to the southward of the city of Marion; thence passes in a northwesterly direction through a portion of the southwestern corner of the city; again entering Marion Township, it runs still in a northwesterly direction, and finally discharges into an open ditch, which also receives a portion of the storm sewage of the city of Marion. The open ditch flows in a westerly direction, and at a point about a mile below the outlet of the drain joins Rock Swale Creek, another and larger ditch, which receives the effluent from the Marion sewage disposal plant and also the discharge of several storm water sewers.

To the southward of Marion city are a group of four slaughter houses, which permit their liquid wastes to enter the above-described tile drain. At about 1,000 feet below the point at which the slaughter house wastes enter, a manhole has been constructed on the line of the drain for the purpose of connecting into it a tributary drain which receives a moderate amount of surface drainage from the near vicinity. Near this manhole are a group of three or four houses, the occupants of which claim that extremely disagreeable stenches arise from the manhole, and that under certain conditions of the atmosphere these stenches permeate the whole neighborhood. In this vicinity, also, holes have been eroded in the earth at points where joints in the tile drain occur. These holes, like the manhole, act as vents, and permit disagreeable odors to escape. Several of these holes were observed within a very few feet of one of the habitations above referred to. Within twenty feet of the drain is a shallow dug well, which is used for drinking and general domestic purposes by the occupants of at least one of the habitations. From a visual examination it would not seem possible that this well could escape contamination as a result of wastes being discharged into the drain. Beyond this point the drain passes entirely through open fields, and not near enough to any dwelling to cause complaint. In one of these fields, at some distance below the houses above referred to, the drain is joined by the waste drain from the Marion Brewing Company. The combined wastes then flow a distance of several thousand feet before entering the open ditch. From the mouth of the drain emerges a large quantity of evil smelling liquor which discolors the entire stream and fills the bed thereof with foul black deposits.

The drain is constructed of soft tile with uncemented joints, and was, of course, originally intended for subsurface drainage only. Its construction entirely unfits it for receiving slaughter house or brewery wastes, and these should not be permitted to enter it. The nuisance complained of undoubtedly does exist, and those persons affected unquestionably have a right to its abatement. In addition to nuisance created, it seriously pollutes a water course which ultimately discharges into the Scioto River, from which the Columbus water supply is derived.

SLAUGHTER HOUSES. Complaint is also frequently made of odors coming direct from the slaughter houses. As already noted, four of these slaughter houses are located in a group within a short distance of the drain and just to the south of the Marion city corporation line. They are all small establishments of about the same size. An estimate of the magnitude of the business may be obtained from the average number of animals killed weekly in one of them, as follows: Twelve to sixty hogs (depending upon the season of the year), six to eight sheep, twelve calves and twelve head of cattle. The only operations carried on are slaughtering and dressing of the animals and the rendering of tallow. The rendering of offal and scraps is not practiced, nor are sausages or other meat products manufactured.

The offal, including manure, thick blood and intestinal matter, is removed to farms in the vicinity and plowed into the ground. A small amount of the intestines is retained for feeding to hogs, of which a few at least are usually on the premises. Bones are also thrown to the hogs so that they may remove such meat as remains upon them. After this the bones are sprinkled with lime and stored in a bin. When a large quantity has accumulated, usually representing a period of two months, they are removed and taken to fertilizer works.

It was stated at the time of inspection that the slaughter houses were in unusually cleanly condition, owing to recent activity on the part of the township health officer. Nevertheless, they appeared to be in very filthy condition. The stock yards were littered with bones having adhering flesh in a decomposed condition and a considerable amount of unsightly refuse. Near the buildings were boxes exposed to the air and containing intestines and intestinal matter, all in a decomposing condition and alive with maggots and flies. The buildings are rudely constructed of rough lumber, and the inside walls and floors are extremely dirty and caked with grease and dried blood. The floors are of wood and are poorly made. They are sloped in such a manner as to carry the liquid wastes to a sump, or sink, where they are partially screened to remove solid matters, and thence are permitted to flow through a connecting drain to the county tile drain. Such solid matter as is not intercepted by the screen, and all other solid wastes, are thrown into the open box above referred to, where they remain until a sufficient quantity has accumulated for removing to the farms to be plowed into the ground. All fat and other material capable of being rendered into tallow is stored until a sufficient amount has accumulated for making up a batch of tallow. This occurs every two or three days. The material is exposed to the air, and as observed was covered with flies. In tallow rendering it is not permissible to allow the material used to reach a decomposing condition, yet under ordinary circumstances it may have become sufficiently tainted by exposure to the air to be exceedingly malodorous, especially during the rendering process. The pressings from the tallow-making process are maintained on the premises until some one can be found to carry them off. Usually it is not found necessary to keep them for more than a few days, as they are valuable as a chicken food.

All the slaughter houses are very crude in their construction, and are maintained in a very filthy manner as compared with modern standards of cleanliness. There can scarcely be any doubt that the odors arising from the slaughter houses are exceedingly disagreeable and may be carried by favorable winds to great distances. It would seem advisable for the township authorities to formulate a set of rules and regulations which would necessitate their entire reconstruction if they are to remain within the township. As suggestive of what general conditions such a set of rules and regulations should aim to produce, the following is offered:

The buildings should be substantially constructed, preferably of brick or other masonry, and should be well lighted and ventilated. The presence of an abundance of light and air cannot be too greatly emphasized.

All floors should be made of concrete, with a smooth granolithic surface, and so sloped and provided with drains as to quickly and readily carry off all liquids which may fall upon it. A footboard should be formed by carrying up the granolithic surface onto the side walls to a height of six inches to one foot. The angle at the junction of the footboard and the floor should be provided with a fillet having an easy curve, thus avoiding corners and simplifying the process of cleaning the floors.

All walls should be wainscoted to a height of at least six feet above the floor. This wainscoting should be preferably of salt-glazed or enameled brick. If wood must be used, the waiscnoting should be made of dressed lumber at least one inch in thickness, carefully matched and laid with close joints.

All woodwork, of whatever character, such as for killing stalls, tables and the like, should be made of dressed lumber and should be substantially constructed.

The design of all parts of the buildings and equipment should be such as to permit of easy access for cleaning purposes.

Without the buildings, all hog and cattle pens should be enclosed by substantial fences, and ample space should be provided so as to avoid crowding of the animals. Frequent whitewashing of the fences not only promotes cleanliness, but also greatly improves their appearance.

In order to prevent the promiscuous scattering over the ground of food of whatever character, the pens should be provided with special feeding places. These places should be paved with granolithic pavement and have suitable troughs for food and water. Special feeding places are particularly necessary in the case of hogs. All feeding places should be thoroughly flushed once per day.

With regard to the maintenance of the plant, all offal and manure should be removed daily, and the receptacles in which same is contained should be thoroughly cleaned directly after being emptied. Should it be decided to render offal, for the purpose of recovering grease and tankage, this should be done daily, and the plant used in this process should be especially designed and housed so as to minimize the disagreeable odors to which this process in nearly all cases gives rise.

Provision should be made for having an abundant supply of pure water on hand for cleansing purposes, and the same should be used freely. All liquid wastes, unless they can immediately be removed and properly applied to land, should be purified in a suitably constructed purification plant. This can be accomplished by methods similar to those in use for the purification of domestic sewage, but a different proportioning of parts would undoubtedly be necessary when these methods are applied to the purification of slaughter house wastes.

Before placing any system of rules and regulations into effect, it would be advisable to submit same to the State Board of Health for criticism and suggestion.

In the matter of the purification of the liquid wastes, the State Board of Health should also be consulted for advice relative to a plant of proper design and construction.

It is recognized that the construction of slaughter houses as above outlined would be a serious burden on the individual butcher, and it is therefore suggested that a combination might be effected among the owners of these slaughter houses whereby there would be built and operated conjointly a properly constructed slaughter house.

MARION BREWING COMPANY.—As already noted, the Marion Brewing Company discharges large quantities of wastes into the county tile drain. It is estimated that the total average daily volume of these wastes is in the vicinity of 16,000 gallons. By far the most of this is comparatively clear wash water used in washing beer bottles and barrels. The remainder consists of floor drainage and washings from fermenting vats and storage casks. Notwithstanding the large volume of water involved, these combined wastes are putrescible and capable of giving off very disagreeable odors. Owing to the fact that they enter the drain at a considerable distance below where they are apt to give rise to a nuisance, it is not likely that they would ever be complained of. However, they add considerable contamination to the ditch into which they discharge and render the water unsightly. Probably the best disposition that could be made of the brewery wastes would be to discharge them into the city sewers and permit them to be purified at the city sewage disposal plant. Should this not be feasible, it might be possible to combine the brewery wastes with the liquid wastes from the slaughter houses, which combination would probably render them both more amenable to treatment by the ordinary methods of sewage purification than either alone.

REPORT OF AN INVESTIGATION OF TYPHOID FEVER AT RISING SUN.

The village of Rising Sun is in the southwestern part of Wood County, and has a population of between 700 and 800. The peculiar character of the underlying limestone, and its effect upon the drainage of the town, has been described in previous reports of the State previously mentioned, that they are pretty well localized in the western portion of the town, and that there is no apparent connection between the cases occurring during 1907 and 1908.

The information obtained from the case cards is given below in detail, in order that a clear idea of the method of arriving at a conclusion in regard to the epidemic may be given.

Case No. 1—Female. Taken sick during the third week of July. Doctor called on the 22d. Still ill at time of investigation. Patient previous to illness had spent a great portion of the time at Fostoria, where typhoid was prevalent. Well drilled about fifty feet, and cased for twenty-five at least. The water from this well had been examined at the laboratory of the State Board of Health, and was of excellent quality, though it probably, in common with most of the wells of the town, could easily become contaminated. Three other cases later occurred in the house. This case was the first in the village during the present year, and in all probability was imported from Fostoria. The sanitary conditions surrounding this case were very poor. Although the privy was in good condition (with the exception of its easy access by flies), all the water from washing soiled linen was thrown out upon the ground without any disinfection, at least in the early stages of the disease.

Case No. 2—Male. Age 4. Taken sick about August 1. Had not recovered at time of investigation. This case was infected in town, as he had not been away for several months. The drinking water was obtained from a well about 32 feet deep. This well was in all probability the cause of this case. Its surroundings were far from sanitary; an overflow pipe leading from it to the main sewer had been backed up at some time, and doubtless some of this material had reached the well. The stools from this patient had been thrown out upon the ground at various times, after being treated with carbolic acid.

Case No. 3.—Male. Age 24. Taken sick about August 8th. This man had been employed as a teamster at Fostoria. The probable cause of the infection, however, was at home. Case No. 1 was his wife.

Case No. 4.—Female. Age 15 months. This case was taken sick August 12th, and probably infected from case No. 2, an inmate of the same house. The sanitary condition of this family was very bad, the house was not screened, and the patients had very little care.

Case No. 5—Female. Age 7. Taken sick August 15. This case was the daughter of cases Nos. 1 and 3.

Case No. 6—Female. Age 36. Taken sick August 16th. Up to the time of her illness she had taken care of cases 2 and 4, and was probably infected in this way, though here again the well may have been the cause.

Case No. 7—Female. Age 6. Taken sick August 16th. This was the only case in this house. The water was obtained from a deep cased well, but this well was very near to the storm sewer. This case was convalescing at the time of the investigation. The house in which it occurred was in process of construction, therefore the sanitary conditions were necessarily not of the best.

Case No. 8.—Male. Age 20. Taken sick August 24. This is the only case in the northeast portion of the town, and probably did not originate in this place. The man had spent very little time at home during the summer, being employed by a roofing company, which did work all over the county. The sanitary conditions surrounding this case were excellent.

Case No. 9.—Male. Age 42. Taken sick August 26. Died September 8. This case was a farmer who lived just outside the corporation limits. This patient had spent two days at Niagara Falls about a month previous. A direct route of infection, however, was established between this case and and case No. 1, as receptacles for buttermilk, described as very dirty and containing some milk, was sent by case one to be filled here, and after standing over night was washed out by the wife of case No. 9.

Case No. 10.—Male. Age 13. Taken sick August 26. Died September 12. This case was the son of case No. 9, and had exactly the same opportunity for infection.

Case No. 11.—Male. Age 5. This was the second case east of the Hocking Valley tracks. The surroundings of the home were good, and there seemed to be no direct connection between this case and others. It is very possible that flies carried the infection in this case, though the house was well screened.

Case No. 12.—Female. Age 12. Taken sick August 27. This case originated in the same house as cases 1, 3 and 5.

Case No. 13.—Male. Age 7. Taken sick September 1. Sanitary condition surrounding this case above the average. The water used was from a drilled well near the storm sewer previously mentioned. The stools of this patient after a more or less perfect disinfection, had been buried.

Case No. 14.—Female. Age 30. Taken sick September 4. This case had not been absent from home for over a year, The house was very near to cases Nos. 13 and 7, and was also located very near the sewer. The water used was from a drilled well similar in character to that used by cases 7 and 13.

Case No. 15.—Female. Age 8. Taken sick September 6. It is doubtful whether or not this was a case of typhoid. The house was near that of case No. 1 and was situated on a branch sewer running into the main storm sewer. The sanitary condition of the premises was fair, with the exception of the well; the household slops were deposited directly above this.

An analysis of the information in the record of cases shows that a fairly severe epidemic had sprung up about some definite point; that the infection was constant and rather localized in its effect.

Investigation developed the fact that the first case had recently moved to town from Fostoria, where typhoid was epidemic, and that she often visited that place for considerable periods even up to the time of her being taken rather severely ill. There had been no cases of typhoid in town for about a year, and the well used by this case in Rising Sun had on analysis proven good. The first case, therefore, was probably an imported one coming from Fostoria.

The family washing of the first case was done at home and the water thrown out upon the ground, to be taken up by a porus tile drain, shown on the sketch. This tile drain often clogged for the lack of sufficient pitch and on account of accumulation of filth therein. On the 21st of July there was a rather severe rain in the town, and though this was one day before the doctor was called the woman had been ailing for several days, and the clothes water from the laundering had been thrown into the inlet of the aforementioned tile drain; this tile drain empties into a catch basin near the Hocking Valley tracks, into which basin also empties the main drain of the town. In time of rains water easily backs up this drain for the entire length of the section drained by it. The well where the second case occurred has an overflow drain about six inches from the top of the well which directly connects with the main drain of the town. That the water does back up in this overflow drain was proven by the fact that a considerable amount of ill smelling material evidently from the sewer had been removed from this basin shortly after the first case of typhoid. A direct communication between the first and second cases seems to be pretty clearly established, but the fact that the sewer was open, that there was no direct communication between it and the other wells and that in all probability the infective material rapidly flowed away when the rain had ceased, for a time saved those families nearer the location of the first case and near the sewer; at least no other families were infected until August 16.

The subsequent infection was probably caused by the seepage of the semi-sterilized stools which the family of case No. 2 admitted having thrown on the ground; this being at the higher end of the town might cause a steady infection. The epidemic follows closely the line of the sewer, and it is probable that the excreta from No. 2 went pretty directly into this, though it is intended for surface water only, and thence through the uncemented joints, infecting the wells.

A direct line of communication was established between the first case and cases Nos. 9 and 10, as the family of the first case sent to Frye's for buttermilk, and the pail which they sent was described as being unclean and containing some milk, which was washed out and thrown on the ground. The pails were probably infected.

A review of the situation leaves very little doubt that the storm sewer above mentioned was the chief factor in spreading the disease, It is also evident that it is only by the exercise of the greatest care that the

the wells of this town can be kept free from pollution. The remedy for the present situation is obvious. It will be necessary to boil all the water used for drinking purposes, or for washing uncooked vegetables. All privies should be rendered inaccessible to flies. The State Board of Health rules for the construction of privies in reference to the admission of flies reads as follows:

The receptacles in which fecal matter is contained shall be entirely enclosed in a suitable compartment under the seats which will prevent the admission of flies, but shall be so constructed as to be readily accessible for inspection and the removal of receptacles.

It will of course be necessary to so alter the construction of the storm sewer in the western end of the town, to render it safe. All plans in reference to such alteration should be submitted to the State Board of Health for approval. Owing to the peculiar geological formation underlying the town it will be seen that no precaution is too great to be taken in rendering the water supply of the town safe at the present conditions. The safety of the town depends upon the prompt recognition of any case of typhoid and the careful watching of such cases as do develop to prevent any contamination of the water supply by these cases.

REPORT ON INVESTIGATION OF ALLEGED NUISANCE AT ST. BERNARD.

Under date of June 12th, 1908, a communication was received from the health officer of St. Bernard stating that the people of that village were suffering from bad odors emanating from fertilizer works and glue and soap factories. The communication further stated that council had passed an ordinance with a view to remedying matters, and that before proceeding further they wished an investigation to be made by a representative of the State Board of Health. Subsequently, a communication was received from Bond Hill, which adjoins St. Bernard, in which similar complaint was made relative to disagreeable odors from the above named works. The vice-president of the Board, Dr. Stanton, and one of the assistant engineers were appointed a committee to make the investigation. The committee visited St. Bernard on July 1, 1908, and the following report was made:

The village of St. Bernard lies just to the north of the city of Cincinnati in the valley of Mill Creek. Adjoining St. Bernard to the northeastward is the village of Bond Hill. These villages are estimated to have populations of 4,500 and 1,500, respectively. The surrounding country is moderately hilly, though there are extensive tracts of level bottom land in the stream valleys. Within the limits of the two villages the maximum difference in elevation is perhaps 100 feet. Passing through the northern part of St. Bernard and just to the southward of Bond Hill is a small stream tributary to Mill Creek, and it is in the valley of this stream that all of the industries complained of are located. The village of St. Bernard is to a large extent supported by its industries, while Bond Hill is primarily a residential town and forms one of the suburbs of Cincinnati.

The only concerns which may produce at times objectionable odors are the Bowker Fertilizer Works, which are a branch of the American Agricultural Chemical Company; The Jarecki Chemical Company; The Joslin-Schmidt Company; the Globe Soap Company; and The Proctor & Gamble Company. All but the last named were visited by the committee and an inspection was made of the various processes of manufacture. The following is a more or less circumstantial account of the observations of the committee at the several plants:

BOWKER FERTILIZER WORKS.—These works have about 80 employes (the number varies, somewhat depending on the season). The products manufactured are various grades of fertilizer. The raw material used are enumerated as follows: Phosphate rock; muriate and sulphate of potash; nitrate of soda; animal tankage; garbage tankage; sulphate of ammonia; boiled bone; dried blood; and pyrites, the last being used in the manufacture of sulphuric acid. It will be noted that none of the above named raw materials are of a putrescible nature, though some of them have a peculiar odor which is considered by many as disagreeable. This is notably so of the tankage, bone dust, and dried blood. The various materials are prepared by grinding, screening, or other treatment, and are mixed in proper proportions to form the various grades of fertilizer.

An important constituent of nearly all grades of fertilizer is sulphuric acid, which is manufactured on the premises. The manufacture of sulphuric acid gives rise to strong fumes in all parts of the buildings in which the process is carried on, but the most objectionable and those which give rise to practically all of the complaints in the vicinity are due to the escape of nitrous acid gas from the top of the Gay-Lussac tower. In manufacturing sulphuric acid, nitrates are used for the purpose of assisting in the oxidation of the sulphur fumes. The oxides of nitrogen themselves are not diminished in quantity by this oxidation process, but act in a catalytic manner. An effort is made at the end of the process to recover all of the oxides of nitrogen. This is accomplished by permitting the fumes from the lead chambers to come in contact with percolating strong sulphuric acid in the Gay-Lussac tower. Economy in operating the process does not warrant the absorption of absolutely all of the oxides of nitrogen, and so a small amount is permitted to escape into the air. The fumes, however, are very strong, and when carried by winds in the direction of habitations give rise to bitter complaints. It would be perfectly feasible to prevent the escape of any of these gases either by building the Gay-Lussac tower considerably higher or better by passing the escaping gases through some form of scrubber. Either procedure would involve some expense on the part of the owners of the concern, but the expense is not thought to be at all prohibitive.

Aside from the nitrous acid fumes, there emanate from the plant the characteristic odors of fertilizer. These, however, are a necessary accompaniment of the manufacture and storage of such products and no practical method is known for eliminating them. The plant throughout was observed to be very orderly and cleanly as far as the processes used would permit. In certain instances, however, some of the buildings were poorly ventilated.

THE JARECKI CHEMICAL COMPANY.—This plant employes about 62 hands, and in addition to various grades of fertilizer also manufactures sulphate of aluminum. Practically the same raw materials are used as at the Bowker Fertilizer Works, and in addition there are used large quantities of bauxitre ore, or oxide of aluminum, for the production of sulphate of aluminum. Sulphuric acid also is manufactured, which is used both for fertilizers and in making sulphate of aluminum. The same disagreeable nitrous acid fumes emanate from this plant, and the same general method of handling them as suggested in the description of the Bowker Fertilizer Works should be employed. No objectionable fumes or odors could be detected in connection with the manufacture of sulphate of aluminum. The plant as a whole was very orderly and as cleanly as the processes of manufacture would permit.

THE JOSLIN-SCHMIDT COMPANY.—This concern employs when running at full capacity about 110 men. The products manufactured are glue, greases, bone-meal, and fertilizer stock, which last is in part at least composed of waste products from the manufacture of the other items mentioned. The raw material consists of junk bone, scrap leather, tail stumps, fleshings (being small pieces of flesh and hide to which hair is adhering), and a low grade of grease which is derived from tanneries. Some of these materials are putrescible and are in themselves offensive to smell. The processes of manufacture which may give rise to bad odors are the boiling of scrap leather, bone, and other glue stock, and the manufacture of sulphurous acid, which is used in bleaching leather used in glue manufacture. At time of inspection the plant was in very bad condition owing to a recent fire which had destroyed a number of the buildings. Considerable odor arose from putrefying masses of old leather and other material, which were being removed from the ruins. During the inspection, none of the more disagreeable operations, such as boiling of leather and glue stock, was being carried out. Some leather was being soaked in hot water for the purpose of preparing it as a fertilizer base. This process was offensive, but the odors were not very strong. There existed, however, throughout the entire plant a very disagreeable odor which might be described as a combination of acid fumes, decomposing organic matter, and leather. The process of extracting grease is attended with some odors, but these are insignificant compared with others about the plant. The time of inspection was inopportune for observing the plant under regular operating conditions, and it is not possible to say whether the odors in the vicinity would be more or less disagreeable than at this time. At any rate, it is certain that odors do arise from a number of the processes carried out, but these are inseparable from such processes and must be permitted if the works are to remain in this locality.

It might be mentioned, though not strictly relevant, that this plant produces large quantities of liquid wastes, evil smelling and of a putrescible nature, which are discharged into Mill Creek.

THE GLOBE SOAP COMPANY.—There are from 350 to 400 hands employed by this company. The products of manufacture are several grades of soap and a soap powder. The principal output consists of a white soap known to the trade as "Pearl Soap," and a powdered soap known as "Grandma's Washing Powder." The raw materials consist of tallow, lards and other greases, cotton seed oil, cocoanut oil, lime and soda ash. The only processes from which disagreeable odors can arise are the refining of the greases and tallows and the process of saponification. These odors are not very strong or pungent, but with favorable winds can be carried to considerable distances. It was noted that very little complaint was made on account of them. This plant, which is an extremely large one, is so well constructed and equipped that it might be considered as model in every respect. The odors spoken of are inseparable from the process of soap making and must be tolerated if the plant is to remain in its present location.

THE PROCTOR & GAMBLE COMPANY.—This company, which employs about 1,000 hands, also operates a very large soap factory, where the principal product made is "Ivory Soap." Since the processes are essentially the same as at the works of The Globe Soap Company, this plant was not visited. It is known, however, to be operated along model lines and should give no more cause for complaint than the works of The Globe Company.

SUMMARY.

Summing up, it may be stated that the most disagreeable nuisance arising from the various industries in St. Bernard and that which perhaps most affects the health of the community, emanates from the sulphuric acid plants of the fertilizer works and consists of escaping nitrous acid fumes. These, as already outlined, may be intercepted by some simple and efficient method which it is not believed will be excessively costly. All other odors that were noticed during the visit of inspection of the committee are practically harmless as far as health is concerned. and are inseparable from the processes of manufacture from which they arise. In none of the works visited can they be lessened or done away with by any practicable means.

The combined plants from which it is claimed nuisances arise employ in the vicinity of 1,650 persons, about 60 per cent. of whom live in St. Bernard, about 30 per cent. in Bond Hill and other neighboring villages, and about 10 per cent. in Cincinnati. It will be seen, therefore, that these industries must be very important to the welfare of St. Bernard and to some extent to its neighboring communities, and any attempt to force them to comply with unreasonable demands must result in an injury to the community in which they are located.

In the light of the above, the committee would recommend as reasonable the abatement of the nuisance arising from the escape of nitrous acid fumes and any other odors which may be done away with by proper housing of the plant, but would point out that many of the odors are inseparable from the processes of manufacture and must, therefore, be tolerated if the benefit accruing to the community from these industries is to be enjoyed.

REPORT ON SEWERAGE AND DRAINAGE OF THE COMBINED NORMAL AND INDUSTRIAL DEPARTMENT AT WILBERFORCE UNIVERSITY, WITH SPECIAL REFERENCE TO FINANCIAL AID FROM THE LEGISLATURE FOR IMPROVING PRESENT CONDITIONS.

On January 5th, 1909, one of the assistant engineers visited Wilberforce, Greene County, Ohio, to investigate sewerage and drainage conditions at the Combined Normal and Industrial Department of Wilberforce University. The request for the investigation was received from Dr. Wm. A. Galloway, president of the board of trustees of the Combined Normal and Industrial Department, Wilberforce University, under date of December 14, 1908. The results of the investigation are set forth in the following report:

Wilberforce University is a colored educational institution situated in the village of Wilberforce, Greene County, three miles north of Wilberforce station on the Little Miami division of the P., C., C. & St. L. R. R. The university grounds were at one time a summer resort, famous for its medicinal springs, known by the Indians as Ta-wa-wa, "The Sweet Waters." The university is located on comparatively high ground which drains northward to Massie's Creek, toward which the ground slopes rapidly, broken up into numerous ravines.

The university proper began its work in October, 1856, and afforded an opportunity for colored students to obtain the usual academic degrees.

In 1887 the Ohio state legislature passed an act establishing a combined normal and industrial department at Wilberforce University. This department was intended to instruct colored students in normal and industrial studies, such as art, music, shorthand, typewriting, mechanical engineering, cooking, carpentry, shoemaking, plumbing, tailoring, laundering, etc.

The buildings of the state department at Wilberforce University are located on ground deeded to the state for educational purposes, lying southwest of the grounds of the university proper and separated from them by several ravines. The present problem of sewerage and drainage refers particularly to the departments under the control of the state of Ohio.

Since its installation the growth of the university has been very rapid. At the present time the combined normal and industrial departments of Wilberforce University comprise thirteen buildings, as follows: Armory, O'Niel Hall, Arnett Hall, laundry, light and power plant, farm house, engineer's house, blacksmith shop, carpenter shop, Galloway Hall, and three professors' cottages. The buildings of the old university are two in number, a combined recitation and dormitory and the Carnegie Library. Located on the side of the ravine on the grounds of the university are three houses north of Old Town Road and perhaps a dozen houses west of the road.

The school year for the university, including the academic and industrial departments, is from September to June. The combined total population of the university and the industrial department, including employes, is stated to be between 300 and 400, and includes from 100 to 200 students who are housed in the university dormitories. As there is an interchange of students between the old university and the departments maintained by the state, it seems necessary to consider the total population of Wilberforce University with reference to the problem of disposing of the sewage of the state's buildings proper.

RECENT TYPHOID FEVER EPIDEMIC.

The health of the students of the university has ordinarily been excellent. Its water supply is derived from three wells said to be from twenty to thirty feet deep, located in front of the boys' and girls' dormitories, respectively. It is stated that this part of the land owned by the state is fill, and that the wells probably reach a point which was once an old swamp.

To provide water for bathing, for the laundry and for general sanitary purposes, water is obtained from a natural spring which has been flowing for years and was the main spring in the days when Wilberforce was a noted summer resort. From this spring water is pumped by a duplex compound steam pump built by the Platt Iron Works, and with a gasoline auxiliary for summer use. The water is raised into a large storage tank in the top of Galloway Hall, one of the newer buildings, and is then available for supplying the other buildings and for fire purposes. According to fragmentary evidence, a rough approxmation of the water consumption would be about 20,000 gallons daily. The water from the spring appears to be highly impregnated with iron, and is no doubt very hard. No recent analyses of this water are available. The spring is located in one of the ravines, toward which there flows the drainage from the old buildings of Wilberforce University and that from all of the houses located on the grounds of the university proper. The ravine when inspected was practically dry save for a very small stream, along whose banks were heavy growths of algæ resembling Spirogyra and indicative of nitrified or oxidized polluting organic matter. It is apparent that the watershed of this spring may at times be dangerously polluted by sink drainage and leachings from privies, of which there are several within a short distance from the spring, and one in particular, in an especially poor state of repair.

Again, all of the water carried wastes from the main building of the old university, together with kitchen and sink slops, discharged onto the surface of the grounds, and may possibly penetrate into the gravel down to a depth sufficient to affect the waters of the spring. In any event the students of the university have been cautioned against the use of the spring. As before mentioned, it is piped to the dormitories for washing purposes, and could easily be used for drinking by careless students.

Such were water supply conditions when from November 30 to December 5, 1908, there occurred five cases of typhoid fever. Four of the patients recovered and one died. The matter was investigated by Dr. H. M. Platter, medical inspector of the State Board of Health, who made a report to the secretary under date of December 14, 1908. The conclusions drawn by the medical inspector were that there could possibly be an infection of the water supply drawn from the shallow wells, or that the polluted water from the spring had been used for drinking, but no definite conclusions were reached as to the exact origin of the epidemic. Bacterial and chemical analyses were made of the water from two of the wells, one in front of the boys' dormitory and the other in front of the girls' dormitory. The results of the analyses were interpreted as indicating a safe water containing no intestinal bacteria and with all other constituents about normal. No analyses were made of the water from the spring.

PRESENT SEWERAGE AND DRAINAGE.

In the report on the typhoid fever situation the medical inspector of the Board called attention to the fact that the sewage from the institution is discharged onto the surface of the ground only about one-eighth of a mile distant, whence it flows, without further treatment, down a ravine into Massie's Creek. This leads to a consideration of the specific purpose of the present investigation, namely, suggested improvements in present sewerage and drainage facilities.

COMBINED NORMAL AND INDUSTRIAL DEPARTMENT.—All of the larger buildings of the Combined Normal and Industrial Department, Galloway Hall, Arnett Hall, O'Niel Hall and the laundry are connected to sanitary sewers for the removal of sanitary wastes and sink slops. These sanitary sewers comprise perhaps 800 feet of eight-inch pipe, which extends almost due north from Galloway Hall and discharge at the head of a ravine perhaps one-eighth of a mile from the institution. Sewage from O'Niel Hall, the boys' dormitory, is carried in a northeasterly direction, and discharges through a separate sewer into the same ravine. The ravine in which the spring is located is probably not in any way affected by the sewage from the Combined Normal and Industrial Department of Wilberforce University.

WILBERFORCE UNIVERSITY.—As before stated, sewage from the dormitory building of Wilberforce University discharges upon the surface of the ground perhaps 100 feet from the building, and thereby creates very grossly objectionable conditions. The Carnegie Library also has sanitary conveniences, from which the sewage is caused to flow into a separate sewer, which extends in a northwesterly direction to still another ravine, whence it eventually flows into Massie's Creek.

Summarizing regarding the sanitary sewerage of Wilberforce: There are four separate sewer outlets, two for the Normal and Industrial Department and two for the old Wilberforce University. All of them should be classed as dangerous. The practice of discharging crude sewage directly onto the surface of the ground at such a short distance from dwellings is objectionable and probably injurious to health.

DRAINAGE OF THE DEPARTMENTS BELONGING TO THE STATE.—The drainage problem is perhaps as pressing at Wilberforce as that of the sewerage. The main campus for the Combined Normal and Industrial Department is on a fairly level tract of land, which, however, contains a large basin depressed two or three feet below the general level of the country wherein there collects at times of rain considerable quantities of water, which tends to keep the cellars of the buildings wet and thus give rise to objectionable conditions. This water collects chiefly from the areas in and near the campus, which eventually drain in its direction, and is exclusive of roof water, which is either conserved in rain water cisterns or flows through special tile into the ravine.

For the removal of the storm water there exists at present about 600 feet of four-inch soft tile, which extends from Arnett Hall in a southeasterly direction, discharging at the surface of the ground perhaps 100 feet from the entrance to Wilberforce University from the Cedarville, Xenia and Columbus pike. It is apparent that the tile is entirely too small adequately to drain this large area, and there is ample evidence to support the view expressed by the officials of the institution that at times of heavy rains there is very objectionable pondage, causing wet cellars and general dampness long after the period of actual rainfall has passed.

SUGGESTED IMPROVEMENT OF PRESENT CONDITIONS.

Investigation has shown that the present means for disposing of the sewage of the Combined Normal and Industrial Department of Wilberforce University (and those of Wilberforce University as well) are inadequate, such as to cause a nuisance, are detrimental to health and should be improved. Conditions at Wilberforce, in view of the above, and also in view of the recent typhoid fever epidemic, demand:

1. Further and more thorough investigation of the present water supply.
2. Means for purifying the sewage of the institution to a non-putrescible state.
3. Additional drainage for storm water.

INVESTIGATION OF WATER SUPPLY.

The report of the medical inspector of the Board, Dr. H. M. Platter, and conclusions drawn from conditions noted by the writer, point to the possibility of the contamination of both the wells used as a direct source o: drinking water, and also of the water of the spring used for washing and flushing purposes and also probably used for drinking. All sources of water supply used by the Wilberforce University should receive further thorough investigation.

SEWAGE PURIFICATION.

To do away with the present nuisance caused by the discharge of untreated sewage onto the surface of the ground, a sewage purification plant should be cons ructed. Under conditions at Wilberforce, where it is not a question of the protection of a drinking water stream, a satisfactory treatment will be one whereby the sewage is rendered non-putrescible. Local topography, which comprises deep ravines, wooded and extending in many directions, with a steep slope to Massie's Creek, as well as a clay loamy soil, preclude the construction of artificial sand filters of the necessary area at a reasonable cost. The case appears clear, therefore, for the adoption of a type of process which will restrict the filter area to a minimum and will permit the use of coarse-grain filtering material. Presumably a sprinkling filter could be most readily adapted to conditions at Wilberforce.

A suggested method for the treatment of the sewage from the Combined Normal and Industrial Department of Wilberforce University comprises the following: A screen, screen chamber, septic tank, dosing tank and sprinkling filters. Based on a population of 400 persons, with a per capita flow of perhaps 50 gallons daily, the septic tank should have a capacity of about 7,000 gallons. Considering local institutional conditions, it seems desirable to be conservative in estimating the area required for the sprinkling filters. It is therefore deemed advisable to design the filters on a basis of a population load of 10,000 per acre, which will require an area of 0.04 acre. Further, the effluent should be settled in a tank holding about two hours' flow. The filtering material should be 7½ feet deep, and should be held in an erected concrete tank. This preliminary study of the topographical conditions at Wilberforce indicates that a sewage purification plant on the above land can be constructed without undue difficulty and at a reasonable cost.

In the event of the construction of this plant, it is highly desirable that the sewage from all of the buildings of the Combined Normal and Industrial Department be led to one outlet, thence into the septic tank. Although foreign to the question of the disposal of the sewage from the state portion of Wilberforce University, it would be desirable, and could probably be accomplished at a small cost, were the sewage from the old university building and that from Carnegie Library also conducted to the proposed sewage purification plant.

ADDITIONAL DRAINAGE.

Present drainage conditions for the state's buildings at Wilberforce demand additional drainage. Presumably this can be readily accomplished, and at small cost, by laying a tile of suitable size. To solve the drainage problem completely, the tile should be extended to the north and to the west to include the drainage from all of the buildings of the institution. It cannot be too strongly stated that if the suggested sewage purification plant is built, water from the roofs of the buildings should be kept out of the sanitary sewers. Storm water interferes greatly with the operation of the purification plants, which are intended for domestic sewage only, and renders their operation more difficult and more expensive. It is therefore desirable, in considering an extension of the present drain, that the roofs of the buildings now connected to the sanitary sewer be instead connected to the new drain tile.

COST OF IMPROVEMENT AS BASIS OF FINANCIAL APPEAL TO LEGISLATURE.

For several years past the trustees of the Combined Normal and Industrial Department of Wilberforce University have included in their estimate of expenditures sent into the legislature for appropriations an item of perhaps $2,500 for improved sewerage and for additional drainage. The necessary funds, which have hitherto been stricken from the appropriation, are again earnestly requested by the trustees for the appropriation for the present year.

The improved means of disposing of the sewage of the institution—namely, its purification to a non-putrescible state by the modern process of screening, sedimentation and filtration through coarse material on a sprinkling filter basis—roughly estimated, will cost between $4,500 and $5,000. This includes the cost of constructing the purification plant, supervision during construction, the cost of extending the present sewer to the sewage purification plant and making of necessary connections therewith and other provisions for additional drainage.

REPORT OF LABORATORY WORK

For Year Ending December 31st, 1908

REPORT OF CHIEF OF LABORATORIES

I have the honor to present the following report for the year ending December 31st, 1908.

The total number of examinations made during the year were 2,932, divided as follows:

Bacterial diagnoses	1,923
Sanitary water analyses	766
Sewage and trade wastes	193
Special examinations	50
Total	2,932

In addition to the above two typhoid epidemics were investigated by Mr. L. V. Parker, reports on which will be found elsewhere in this volume. In one case the infection apparently came from shallow wells polluted from improperly constructed privies; in the second case, the infection was definitely traced to an improperly constructed drainage system which caused the pollution of a number of private wells.

The following papers were published during the year, based on original work done in the labroatory:

Notes on the Use of Smith's Solution and Bile Media.

L. V. Parker, American Journal of Public Hygiene, Volume IV N. S., Page 137.

Notes on Method of Determining Total and Volatile Suspended Matter in Sewage.

C. B. Young and C. F. Long, American Journal of Public Hygiene· Volume IV N. S., Page 165.

TABLE CLASSIFYING AND SUMMARIZING EXAMINATIONS FOR THE YEAR 1908.

	Diphtheria.	Tuberculosis.	Typhoid.	Rabies.	Miscellaneous.	Water Analyses.	Sewages and Wastes.	Total.
January	127	110	2	1	9	7	..	256
February	40	109	13	2	3	20	..	187
March	20	115	7	2	1	19	..	164
April	17	123	16	2	1	15	..	174
May	13	99	14	4	2	22	2	156
June	11	134	17	4	7	34	..	207
July	6	103	13	2	1	99	8	232
August	5	100	36	8	7	158	..	314
September	13	94	29	6	7	100	30	279
October	37	90	28	4	3	130	56	348
November	53	84	28	4	7	102	58	336
December	50	94	28	6	2	60	39	279
Total	392	1,255	231	45	50	766	193	2,932

DIPHTHERIA.

TABLE SHOWING NUMBER OF EXAMINATIONS CLASSIFIED.

	Positive.	Negative.	Total.
January	70	57	127
February	18	22	40
March	8	12	20
April	7	10	17
May	2	11	13
June	6	5	11
July	1	5	6
August	1	4	5
September	3	10	13
October	19	18	37
November	25	28	53
December	28	22	50
Total	188 48%	204	392

The total number of examinations made falls below the total number made during 1907 by 83. During 1907, however, 132 cultures were taken at the Girls' Industrial school at Delaware, and 133 in 1908 in order to suppress an epidemic. Subtracting these special examinations the number of regular routine examinations for 1908 drops but 49. The percentage of positives remains about the same.

TUBERCULOSIS.

SHOWING MONTHLY EXAMINATIONS CLASSIFIED.

	Positive.	Negative.	Total.
January	28	82	**110**
February	26	83	**109**
March	31	84	**115**
April	36	87	**123**
May	27	72	**99**
June	42	92	**134**
July	35	68	**103**
August	40	60	**100**
September	26	68	**94**
October	22	68	**90**
November	32	52	**84**
December	32	62	**94**
Total	377 30%	878	**1,255**

The number of sputum examinations for 1908 shows an increase of 57 over 1907, the percentage of positives remaining the same. This percentage while seemingly low is higher than in some other places. As the physicians become more accustomed to using the laboratory for sputum examinations they are apt to submit specimens on slighter clinical evidence. It seems well to impress the fact that a single negative examination means little, and that until a breaking down of lung tissue occurs, no bacilli can be found in the sputum.

TYPHOID.

SHOWING NUMBER OF MONTHLY EXAMINATIONS CLASSIFIED.

	Positive.	Negative.	Total.
January	..	2	**2**
February	8	5	**13**
March	5	2	**7**
April	11	5	**16**
May	7	7	**14**
June	9	8	**17**
July	4	9	**13**
August	17	19	**36**
September	18	11	**29**
October	14	14	**28**
November	15	13	**28**
December	22	6	**28**
Total	130 56%	101	**231**

The Widal examinations for typhoid show a decrease of 40 over 1907, and the percentage of positives a decre [illegible].

RABIES.

SHOWING MONTHLY EXAMINATIONS CLASSIFIED.

	Positive.	Negative.	Unsatisfactory.	Total.
January	..	1	..	1
February	2	..	..	2
March	2	..	..	2
April	2	..	..	2
May	3	1	..	4
June	2	2	..	4
July	2	..	..	2
August	6	1	1	8
September	3	1	2	6
October	3	1	..	4
November	3	1	..	4
December	4	..	2	6
Total	32 71%	8	5	45

The number of rabies examinations exceeds by 13 the number in 1907, the percentage of positives remaining about the same. It is evident that in Ohio as in other states rabies is on the increase and is likely to continue to increase, unless muzzling laws can be enforced. As the laboratory usually makes examinations only when persons have been bitten by the rabid animals, we may safely say that at a minimum estimate 75 persons have been bitten by dogs whose heads were subsequently sent to the laboratory for examination. At a minimum estimate of $125.00 per person for Pasteur treatment this represents an outlay of $9,375.00 by the people of the state for the cure of a disease that might have been prevented by care, and enactment and enforcement of local muzzling laws.

MISCELLANEOUS.

SHOWING MONTHLY EXAMINATIONS.

January	9
February	3
March	1
April	1
May	2
June	7
July	
August	7
September	7
October	3
November	7
December	2
Total	50

The above table includes all special tests as follows:

Waters, special tests only	14
Meats for ptomaines or parasites	3
Sludge	1
Sand or gravel	23
Copperas	1
Deposit on brass strainer	1
Milk	3
Alum	2
Raw wastes	1
Microscopic growth	1
Total	50

WATER ANALYSES.

SHOWING MONTHLY EXAMINATIONS CLASSIFIED.

	Proposed Supplies.	Present Public Supplies.	Private Supplies.	Mahoning River Special Investigation.	Total.
January	..	...	7	..	7
February	..	..	20	..	20
March	7	..	12	..	19
April	..	4	11	..	15
May	4	6	12	..	22
June	6	6	22	..	34
July	11	37	18	33	99
August	14	94	36	14	158
September	15	18	59	8	100
October	2	25	56	47	130
November	18	42	42	..	102
December	7	39	14	..	60
Total	84	271	309	102	766

SEWAGE AND TRADES WASTE.

	Number of Samples.
January	...
February	...
March	...
April	...
May	2
June	...
July	8
August	...
September	30
October	56
November	58
December	39
Total	193

WATER ANALYSES ON SAMPLES FROM PRIVATE SOURCES SHOWING MONTHLY EXAMINATIONS CLASSIFIED.

CAUSE FOR EXAMINATION.

	Typhoid.	Quality.	School Well.	Total.
January	4	2	1	7
February	17	3	..	20
March	5	6	1	12
April	8	2	1	11
May	6	6	..	12
June	15	7	..	22
July	16	2	..	18
August	28	7	1	36
September	42	12	5	59
October	31	18	7	56
November	38	4	..	42
December	11	1	2	14
Total	221 71%	70	18	309

WATERS—SHOWING RESULTS OF ANALYSES FROM PRIVATE SOURCES CLASSIFIED.

	Pure.	Suspicious.	Polluted.	Total.
January	4	2	1	7
February	12	6	2	20
March	7	1	4	12
April	4	4	3	11
May	5	3	4	12
June	9	4	9	22
July	5	2	11	18
August	20	6	10	36
September	22	15	22	59
October	35	10	11	56
November	21	2	19	42
December	12	..	2	14
Total	156 50%	55 18%	98 32%	309

As shown by the above table 71% of all waters submitted for analysis from private sources are sent in by individuals, with the permission of the local health authorities on account of typhoid fever cases among the users of the water. The table shows that one-half of the waters submitted could be regarded as pure, while only about one third could be classed as distinctly polluted. It is but natural perhaps for the laity to suspect first of all the well water as the cause of the infection supposing as many undoubtedly do that the infection may be generated, spontaneously from impurities. In some cases the local health authorities might eliminate the well as a source of infection by a logical deduction from the facts, as for example in a school house or factory where only one or two out of a large number of users are infected, or in private families where no strangers have used the privy for a period of several weeks. In the latter case infection must have been brought to the house by some member of the household. It might be argued that the well water should be analyzed at all events to see if infection from the privy were possible, but thorough disinfection of all excreta from the patient is of course of far more importance.

SUMMARY OF REPORT ON LABORATORY WORK FROM ITS INCEPTION TO THE PRESENT.

Year.	Diphtheria	Tuberculosis.	Typhoid.	Miscellaneous.	Rabies.	Waters.	Sewages.	Total.
1899	14	1	3	23	..	613	..	654
1900	42	2	..	43	1	671	..	759
1901	68	6	1	41	..	493	..	609
1902	29	10	..	43	2	801	120	1,005
1903	178	10	1	46	5	954	..	1,194
1904	44	35	2	67	5	655	.	808
1905	296	814	141	42	9	450	126	1,878
1906	515	994	161	99	34	1,309	443	3,555
1907	475	1,189	169	102	34	1,107	151	3,227
1908	392	1,255	231	50	45	766	193	2,932
Total	2,053	4,316	709	556	135	7,819	1,033	16,621

One noticeable feature of the above table is the constantly increasing number of sputum examinations. It is probable that with an awakened public interest in this disease, and an increasing use of the laboratory by physicians that this number will be materially increased in the future.

The laboratory was under the direct charge of Mr. L. V. Parker up to December 1st, 1908, and to him should be given all credit for the general management during this year.

Respectfully submitted,
BURT R. RICKARDS,
Chief of Laboratories.

To the Secretary of the Ohio State Board of Health,
April 20th, 1909.

CITY AND VILLAGE HEALTH OFFICERS

CORRECTED TO APRIL 16, 1909

HEALTH OFFICERS OF CITIES AND VILLAGES.

Place.	Health Officer.
Aberdeen	Dr. S. A. Laughlin.
Ada	J. H. Morrow.
*Adamsville	H. E. Darner.
*Addyston	Dr. J. H. Haire.
Adelphi	W. S. Koch.
*Agosta P. O. (New Bloomington)	Harry E. Snyder.
Akron	Dr. A. A. Kohler.
Albany	Walker Neff.
*Alexandria	Elim M. Shaub.
Alger	C. C. Neal.
Alliance	Dr. L. A. Crawford.
Alvordton	Jno. L. Rutledge.
Amanda	Geo. Boerstler.
*Amelia	Dr. Homer C. Behymer.
Amesville	J. C. Snedeker.
Amsterdam	W. E. Williams.
Andover	Dr. F. L. Sargent.
*Anna	Dr. D. R. Milliette.
*Ansonia	Dr. C. J. Wood.
*Antioch	Dr. D. W. Lowe.
*Antwerp.	Andrew J. Schilb.
*Apple Creek	H. H. Wilhelm.
*Arcadia	J. G. Orth.
Arcanum	Dr. W. B. Graham.
Archbold	August Ruihley.
Arlington	Solomon Bates.
*Arlington Heights	Jess R. Miller.
Arnettsville (Pittsburg P. O.)	
*Ashland	E. A. Kauffman.
*Ashley	Jas. M. Worline.
Ashtabula	Dr. A. W. Hopkins.
Ashville	Jno. Johnson.
*Athalia	Dr. S. V. McGown.
Athens	Dr. J. M. Higgins.
*Attica	J. C. Work.
Avon	Dr. Jno. R. Pipes.
*Bainbridge	Dr. J. H. Pake.
*Bairdstown	D. M. Cassner.
Baltic	Jno. Hoobler.
*Baltimore	S. S. Weist.
*Barberton	Dr. Geo. A. Brown.
Barnesville	W. T. Evans.
Barnhill	Lewis Just.
Basil	T. F. Basch.
Batavia	C. H. Crane.
Batesville	Geo. Lashley.

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* In lieu of a board of health.

Place.	Health Officer.
*Bay (North Dover P. O.)	
Beach City	Theodore F. Stamm.
Beallsville	Dr. O. M. Keesor.
*Beaver	Dr. A. L. McAllister.
Beaver Dam	Dr. E. C. Yingling.
Bedford	Dr. W. H. Black.
Bellaire	Dr. D. W. Boone.
Bellbrook	R. M. Martz.
Belle Centre	W. G. Oliphant.
Bellefontaine	Dr. Frank B. Kaylor.
*Belle Valley	Dr. Frank R. Dew.
Belleville	Dr. J. W. Kelley.
Bellevue	Dr. J. F. Miller.
Belmont	James A. Burson.
Belmore	Dr. G. B. Adrian.
Beloit	R. H. Oswalt.
Belpre	Jesse McGrew.
Benton Ridge	Dr. R. D. Whisler.
Berea	A. A. Smith.
*Bergholz	Thos. McConaughy.
*Berlin X Roads	Chas. W. Hawk.
*Berlin Heights	Dr. G. W. Hine.
*Berne P. O. (Carlisle)	W. R. Bromhall.
*Bethel	Dr. W. E. Thompson.
*Bettsville	H. M. Craig.
Beverly	Fred H. Hart.
Bexley	F. B. Holtzman, Mayor.
*Blakeslee	Mathias Thiel.
*Blanchester	A. Titus.
Bloom Center	Dr. O. C. Wilson.
*Bloomdale	G. W. Urie.
Bloomfield (Bloomingdale P. O.)	
*Bloomingsburg	H. W. Worrell.
Bloomville	D. W. Fellers.
Bluffton	R. E. Hughson.
*Bolivar	Fred Renner.
*Boston (Owensville P. O.)	
*Botkins	G. A. Biebesheimer.
Bourneville	Dr. Lindley F. House.
*Bowerstown	H. Karn.
*Bowersville	J. E. Steward.
Bowling Green	W. E. Avery.
*Bradford	B. H. Sothoron.
*Bradner	J. C. Brown.
*Bratnahl	J. G. Newkirk.
*Bremen	T. L. Householder.
*Bridgeport	Oliver Porter.
Brilliant	Frank Barcus.
*Brinkhaven P. O. (Gann)	Jacob Fendrick.
Brooklyn P. O. (South Brooklyn)	R. E. Stickney.
*Brooklyn Heights	Jos. E. Richardson.
Brookville	A. M. Campbell.

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* In lieu of a board of health.

Place.	Health Officer.
*Broughton	James Boroff.
Bryan	August Heidley.
*Buchtel	Ralph Ball.
Buckeye City	F. M. Welker.
Buckland	Dr. R. W. Sharp.
Bucyrus	Dr. A. H. McCrory.
Buffalo (Hamlet)	Charley Frye.
*Burbank	A. W. Hoffman.
Burkettsville	Dr. B. G. Inman.
*Burton	Isa Teed Crampton.
*Butler	D. J. McCready.
*Butlersville	Elias Smith.
*Byesville	Wm. Unklesbay.
*Cadiz	Wm. H. Lemmon.
*Calais	J. R. Johnson, Acting.
*Caldwell	W. L. Evans.
Caledonia	Noah Lee.
Cambridge	Dr. W. T. Ramsey.
*Camden	Dr. Geo. W. Homsher.
*Canal Dover	H. H. Prince.
Canal Fulton	Wm. Logan.
*Canal Winchester	Dr. J. W. Shook.
Canfield	John C. Starr.
*Cannelville (Dillons P. O.)	
Canton	Dr. Frank DaHinden.
*Cardington	C. F. Axthelm.
*Carey	Joseph F. Wonder.
*Carlisle (Berne P. O.)	
Carroll	Dr. H. L. Bounds.
Carrollton	Dr. A. H. Hise.
*Carthage	Dr. Odus D. Simmons.
*Casstown	Dr. W. W. Baker.
Catawba	Forest Mahar.
*Cecil	Dr. F. W. McNamara.
Cedarville	Samuel Albright.
Celina	Dr. Jos. Sager.
Centerburg	Dr. S. Robert Best.
*Centerville (Montgomery County)	Dr. B. W. Dudley Keever.
Centerville (Thurman P. O.) Gallia Co.	
*Chagrin Falls	D. A. Groves.
*Chambersburg (Eureka P. O.)	
*Chardon	John Binley Grimm.
*Chatfield	Samuel Lutz.
*Chauncey	W. T. Sprague.
*Chesterhill	William Johnson.
*Chesterville	Dr. J. D. Varney.
*Cheviot	L. S. Getzendanner.
Chicago Junction	Dr. A. R. Kauffman.
*Chickasaw	Jno. P. Kroeger.
Chillicothe	Dr. W. S. Scott.
Cincinnati	Dr. Mark Brown.
Circleville	Harry S. Sheets.

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* In lieu of a board of health.

Place.	Health Officer.
Clarington	John E. Morrill.
*Clarksburg	Tilden Norris.
*Clarksville	Harry W. Reeder.
Cleveland	Dr. Martin Friedrich.
*Cleveland Heights	Lorenzo Brockway.
*Cleves	F. A. Grossman.
*Clifton	Dr. David E. Spahr.
Clinton (Fitchville P. O.)	
*Cloverdale	Dr. F. O. Hunt.
Clyde	F. G. Tuttle.
*Coal Grove	Dr. M. E. Ramey.
*Coalton	J. C. Duncan.
Coldwater	Dr. A. Bowman.
*College Corner	Jno. D. Simonson.
College Hill	J. E. Deininger.
*Collinwood	Dr. Jerome D. Dodge.
Columbiana	J. D. Holloway.
Columbus	Dr. Sterling B. Taylor.
*Columbus Grove	Dr. N. E. W. Seaman.
*Commercial Point	Harry Trego.
Congress	L. O. Weiler.
Conneaut	Dr. W. W. Wetmore.
*Continental	C. Corbitt.
Convoy	Dr. C. D. Sidle.
Coolville	Dr. A. M. Frame.
Copley	
Corlett	Dr. A. M. Cheetham, Cleveland
*Corning	Wm. Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	Jacob I. Clark.
Coshocton	E. G. Abbott.
Covington	Wm. E. Westfall.
Crestline	Dr. C. A. Marquart.
*Creston	Charles A. Mellen.
Cridersville	J. M. Woodruff
*Crooksville	W. J. Brown.
*Croton P. O. (Hartford)	Dr. C. B. Hempstead.
*Crown City	J. V. Stevers.
*Cumberland	Fred W. Lyne.
*Custar	Dr. H. V. Hall.
*Cuyahoga Falls	William W. Scupholm.
*Cygnet	H. E. Coots.
*Dalton	Dr. J. Coleman Haney.
Danville	Dr. T. E. Jefferson.
Darbyville (Orient R. F. D. 1.)	
Dayton	Dr. Geo. Goodhue.
*Deavertown	Geo. W. Deaver.
Deerfield (South Lebanon P. O.)	
Deersville	W. C. Birney.
Defiance	Dr. J. D. Westrick.
*DeGraff	Jonh W. Hendershott.
Delaware	Dr. F. L. Gage.

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* In lieu of a board of health.

Place.	Health Officer.
*Delhi	C. B. Davis.
*Dell Roy	Dr. S. B. Lechner.
*Delphos	Dr. Norman E. Brundage.
Delta	Geo. A. Everett.
Dennison	Dr. L. H. Hughes.
*Deshler	Isaac Collier.
*Dexter City	G. C. Crosser.
*Dillons P. O. (Cannellville)	Jno. Leach.
Dillonvale	Jno. W. Howell.
Donnelsville	Dr. Horace Heistand.
*Doylestown	E. Dannemiller.
Dresden	Louis Swope.
*Dublin	Dr. W. A. Westervelt.
*Dunkirk	Dr. C. C. McLaughlin.
*Dupont	J. A. Myers.
East Cleveland	J. H. Stamberger.
East Fairfield	Dr. G. H. Albright.
East Liverpool	Dr. C. B. Ogden.
East Palestine	Dr. C. E. Johnston.
*East Springfield	Dr. H. L. Ficus.
*East View (Warrensville P. O.)	
*Eaton	Jno. W. Harris.
Edgerton	Dr. C. Hathaway.
*Edison	Dr. Jno. H. Jackson.
Edon	Geo. Brady.
Eldorado	Geo. W. McCoy.
Elida	Dr. H. Z. Alexander.
Elgin	Geo. R. Hill.
Elmore	Dr. S. F. Drumgold.
Elmwood Place	Dr. E. T. Busching.
Elyria	Dr. Geo. E. French.
Empire	John Hunter.
Enon	B. C. Hebble.
*Euclid	Ernest Earick.
*Eureka P. O. (Chambersburg)	Dr. W. J. Fletcher.
*Fairfield	M. W. Lasure.
Fairmount	L. Hunter, Clerk.
*Fairport Harbor	J. H. Werbeach.
Fairview	C. M. Ault.
*Farmersville	Chas. M. Boomershine.
*Fayette	Benjamin Stoner.
*Fayetteville	John Evans.
*Felicity	J. L. Viers.
*Fernbank	James E. Hickman.
Findlay	Amos Beardsley.
Fitchville P. O. (Clinton)	S. M. Sly.
Fletcher	Dr. I. C. Kiser.
Florida	Wm. Thompson.
*Flushing	Ralph James.
Forest	John Handchy.
Fort Jennings	Ferd Heising.
Fort Recovery	Dr. C. W. Robison.

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* In lieu of a board of health.

Place.	Health Officer.
Fostoria	W. N. Caldwell.
*Frankfort	Jno. A. Davis.
*Franklin	John B. Miller.
*Frazeysburg	G. W. Holtz.
Fredericksburg	Dr. T. F. Richards.
Frederickstown	Dr. J. H. Norrick.
*Freeport (Harrison Co.)	Wm. McNath.
*Freeport (Prairie Depot) Wood Co.	J. W. Coy.
Fremont	Dr. O. C. Vermilya.
Fultonham P. O. (Uniontown)	Dr. C. Z. Axline.
Gahanna	D. L. Stygler.
Galion	Dr. H. H. Hartman.
Gallipolis	Chas. B. Robison.
Gambier	Dr. A. D. Welker.
*Gann (Brinkhaven P. O.)	
*Garrettsville	Dr. Geo. R. French.
Geneva	Dr. F. C. Smith.
*Genoa	Harry Skilliter.
*Georgetown	George Innis.
*Germantown	Wm. Schaeffer.
*Gettysburg	J. L. Nease.
*Geyer	Thos. H. Irwin.
Gibsonburg	J. P. Tierney.
Gilboa	Dr. Bruce Snodgrass.
Girard	Dr. W. S. Thompson.
Glandorf	Dr. Felix C. Harman.
*Glendale	Clifford Allen.
Glenmont	A. L. Jones.
*Glouster	Dr. H. G. Gibson.
*Gnadenhutten	L. S. Winsch.
Good Hope	D. C. Somers.
*Gordon	Dr. H. Z. Silver.
*Grafton	Henry Trau.
Grand Rapids	Wm. E. Kerr.
Grand River P. O. (Richmond)	H. S. Barton.
*Grandview Heights	Dr. McKendree Smith.
*Granville	W. E. Clemons.
Gratis P. O. (Winchester, Preble Co.)	Fred Boesenberg.
Graysville	W. E. Barker.
*Green Camp	G. W. Collins.
*Greenfield	Taylor Neff.
Green Spring	Dr. R. D. Reynolds.
Greenville	S. A. Hawes.
Greenwich	F. C. Wood.
*Grove City	Chas. Donaldson.
Groveport	Dr. C. R. Clement.
*Grover (Tiltonville P. O.)	
*Grover Hill	G. W. Morris.
Hamden Junction	E. L. Harper.
Hamilton	Dr. Mark Milliken.
Hamler	William Frye.
Hanging Rock	Joseph Kinkaid, Sr.

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* In lieu of a board of health.

Place.	Health Officer.
*Hanover	Dr. W. L. Evans.
Hanoverton	Newton Steller.
*Harrisburg	Albert Deyo.
Harrison	Bruce Hardin.
Harrisville	W. T. Lemmon.
*Harrod	Chas. R. Boyer.
*Hartford (Croton P. O.)	
Hartford (Trumbull Co.)	Dr. C. W. Banks.
Hartwell.	Jno. W. Carey.
*Harveysburg	Dr. Samuel Jasper Ellison.
*Haskins	William H. North.
*Haviland	Dr. Myron A. Hanna.
Hayesville	Dill Andress.
*Hebron	Vincent Harter.
Hemlock	Dr. R. W. Miller.
Herring P. O. (Lafayette)	Dr. N. Sager, Jr.
Hicksville	B. L. Kelsey.
*Higginsport	Geo. Gardner.
Highland P. O. (New Lexington)	
*Hilliards	Dr. C. S. Latham.
Hillsboro	Dr. J. D. McBride.
Hiram	Dr. F. H. Hurd.
*Holgate	Adam Kemmer.
*Hollansburg	Dr. W. B. Roads.
Holloway	J. T. Bendure.
Holmesville	C. W. McClelland.
Home City	Dr. B. F. Lehman.
*Hopedale	Jasper Denning.
*Hoytville	James Nichols.
Hubbard	Dr. W. S. Bond.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. F. A. Richardson.
*Huron.	Robert Day.
Ironton	Dr. E. E. Wells.
Ithaca	Dr. J. C. Hamilton.
Jackson	Dr. Wm. H. Shellenger.
Jacksonboro	John Stamm.
*Jackson Center	A. A. Davis.
*Jacksonville	Henry Wolfe.
Jamestown	Harry C. Lieurance.
*Jefferson	W. A. Andrews.
*Jeffersonville	Wm. S. Reid.
Jenera	C. H. Heldman.
*Jeromeville	D. B. Naylor.
Jerry City	Austin Van Blarcum.
Jerusalem	I. B. Carleton.
*Jewett	F. W. Beckett.
Johnsonville	E. C. Hitchcock.
Johnstown	Albert Dresback.
Junction City	Dr. H. W. Shaw.
*Kalida	Dr. W. J. Francis.
Kel eys Island	Geo. P. Schardt.

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* In lieu of a board of health.

Place.	Health Officer.
Kenmore	Vernon L. Bissell.
*Kennedy P. O. (Kennedy Heights)	Geo. Romes.
Kent	F. H. Vickers.
Kenton	John M. Ellis.
*Kettlersville	Dr. O. O. LeMaster.
Killbuck	William C. Stout.
Kimbolton	F. M. Fowler.
Kingston	D. B. Golden.
Kirby	Dr. E. E. Burns.
*Kossuth	Jess Conner.
Lafayette (Herring P. O.)	
LaGrange	Dr. J. W. Lindsey.
Lakeside	Dr. O. L. Mapes.
Lakeview	E. D. Carr.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. J. P. Hershberger.
*Larue	G. A. L. Markwith.
Latty	Geo. W. Cook.
*Laura	John O. Loury.
Laurelville	Dr. W. D. Cain.
Lebanon	Dr. A. W. Mardis.
*Leesburg (Leesville P. O.)	
*Leesburg (Highland Co.)	Dr. K. R. Teachnor.
Leesville P. O. (Leesburg)	A. R. Morrison.
Leetonia	Dr. S. R. McCready.
Leipsic	Dr. John C. McClung.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.
*Lexington	Dr. J. P. Stober.
Liberty Center	D. K. Bowker.
Lima	Dr. A. L. Jones.
Limaville	
*Lindsey	John H. Rousch.
*Lisbon	David Eells.
*Lithopolis	Geo. W. Foor.
*Lockbourne	C. S. Wolford.
Lockington	Dr. J. Robt. Caywood.
*Lockland	Valentine Harting.
*Lodi	Henry Selders.
*Logan	Dr. Edw. E. Campbell.
*London	Dr. Jno. W. Parker.
Lorain	Dr. Edw. V. Hug.
*Loramie	Dr. Thos. Walkup.
*Lore City	
Loudonville	Walter S. Young.
Louisville	F. W. Shilling.
Lowell	A. J. Thompson.
*Loveland	Dr. J. D. Wakefield.
*Lowellville	A. E. Schraeder.
Lower Salem	J. P. Hartshorn.
*Lucas	Dr. Emil Heinig.
*Lynchburg	S. S. Puckett.
*Lyons	Dr. Thos. Blair.

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* In lieu of a board of health.

Place.	Health Officer.
*McArthur	Geo. W. Partlow.
McClure	E. E. Britton.
*McComb	Jas. H. Byal.
McConnellsville	J. S. Atkins.
Macedonia	P. B. Seacoy.
McGuffey	Dr. J. B. K. Evans.
*Macksburg	W. E. Smithson.
*Madison	Dr. Wm. Snearer.
Madisonville	Dr. C. L. Metz.
Magnetic Springs	Dr. N. B. Newhouse.
*Magnolia	Jesse McCreary.
*Maineville	Jas. G. Hill.
Malinta	W. M. Hess.
Malta	W. R. Scott.
Malvern	
Manchester	Dr. R. A. Stephenson.
Mansfield	Dr. M. J. Davis.
Mantua	E. H. Knowlton.
Marblehead	L. M. Clemons.
*Marengo	I. E. Eakins.
Marietta	Dr. Clarence Sloan.
Marion	Roy Chapman.
*Marseilles	Dr. E. S. Jones.
*Marshallville	E. D. Ammon.
*Martinsburg	Dr. N. S. Toland.
Martins Ferry	Dr. J. W. Darrah.
Martinsville	Jno. F. Wells.
*Marysville	Dr. C. W. Hoops.
Mason	Dr. M. H. Houseworth.
Massillon	Dr. T. Clarke Miller.
*Maumee	Rolla Corbett.
Mechanicsburg	Dr. H. Dickson.
*Medina	E. T. Pierce.
*Melrose	T. J. Myers.
*Mendon	B. T. Price.
*Mentor	Dr. J. W. Lowe.
Metamora	Elmer Duncan.
Miamisburg	Dr. Wm. Shuler.
Middleburg	C. C. Heath.
Middlefield	Dr. F. S. Clapp.
Middlepoint	J. R. Swainey.
Middleport	Dr. David Sisson.
Middletown	Dr. Geo. D. Lummis.
Midland (Midland City P. O.)	
Midland City P. O	Dr. Leonidas Boulware.
Midway (Sedalia P. O.)	
*Mifflin	Geo. Fulmer.
*Milan	A. E. Doane.
*Milford	Dr. C. J. Spence.
*Milford Centre	Martin Frye.
Millbury	Dr. C. M. Diebert.
Milledgeville	Dr. W. T. Mathews.

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* In lieu of a board of health.

Place.	Health Officer.
*Miller City	Dr. Louis Deuble.
Millersburg	Chas. A. Estil.
Milton Center	Dr. J. F. Noble.
*Miltonsburg	Dr. Chas. R. Keyser.
Mineral City	Dr. F. L. Mate.
Mineral Ridge	Edw. Blunt.
*Minerva	Elmer E. Fultz.
*Mingo Junction	Dr. W. W. McMillen.
*Minster	C. H. Dickman.
*Mogadore	D. J. Robenstein.
Monroe	Jerome Warner.
Monroeville	Dr. E. R. Kreider.
*Montezuma	Geo. Stafford.
Montpelier	Dr. J. V. Lesnet.
*Morristown	A. M. Poole.
*Morrow	Dr. Leonard Mounts.
Moscow	Dr. W. S. Purkheiser.
Mount Blanchard	Samuel E. Moore.
Mount Cory	E. C. Cramer.
*Mount Eaton	Dr. C. N. Clark.
*Mount Gilead	Dr. G. H. Pugh.
*Mount Healthy	Dr. Lafayette Neufarth.
*Mount Orab	Dr. C. H. Mathews.
Mount Pleasant	Thos. O. DeVault.
Mount Sterling	Bruce H. Edington.
Mount Vernon	Dr. H. W. Blair.
Mount Victory	Dr. B. D. Morrow.
*Mount Washington	Dr. W. C. Langdon.
Murray City	Dr. T. J Dillenger.
Mutual	C. M. Goul.
Napoleon	D. H. Hancock.
*Nashville	Dr. A. M. Hoyer.
Navarre	Jno. Bailiss.
Nelsonville	Dr. N. Hill.
*Nevada	Dr. S. S. Barrett.
Neville	F. M. Neal.
*New Albany	F. M. Heischmann.
*New Alexandria	Dr. C. E. Gourley.
Newark	Dr. W. H. Knauss.
New Athens	Dr. A. B. Tubbs.
New Bloomington (Agosta P. O.)	
New Boston	Dr. W. G. Cheney.
*New Bremen	Dr. G. A. Havemann.
Newburgh	Dr. C. L. McCoy.
Newburg Heights (See Willow P. O.)	
*New Carlisle	D. F. Akers.
*New Comerstown	Wm. Tidrick.
*New Concord	Dr. J. Milton O'Neal.
*New Holland	Jno. Morris.
New Knoxville	Dr. H. E. Fledderjohann.
*New Lebanon (Potsdam P. O.)	
*New Lebanon (Montgomery Co.)	Lutie Piatt.

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* In lieu of a board of health.

Place.	Health Officer.
New Lexington (Highland P. O.)	
*New Lexington (Perry Co.)	Dr. N. T. McTeague.
New London	Wm. H. Whitney.
New Madison	A. H. Bausman.
*New Matamoras	J. R. Johnston.
*New Paris	Dr. E. E. Bevington.
New Philadelphia	Dr. Geo. H. Peck.
New Richmond	Dr. C. F. Hera.
*New Riegel	Geo. Lonsway.
*New Salem	Jno. C. Yontz.
*New Straitsville	W. C. L. Hall.
*Newton Falls	A. R. Brown.
*Newtown	Dr. C. R. Campbell.
*New Vienna	Dr. E. W. Brown.
*New Washington	Isaac Hosler.
*New Waterford	Thos. H. Todd.
*New Weston	Dr. A. Pearson.
*Ney	Dr. P. M. Lehman.
Niles	Dr. H. S. Brown.
*North Amherst	Dr. Washington Foster.
North Baltimore	Dr. G. W. Foltz.
*North Bend	Wm. Wiesman.
North Dover P. O. (Bay)	
North Lewisburg	G. L. Freeman.
North Lindale	Hugh Geariety.
*North Robinson	Harry G. Smith.
Norwalk	Louis Fiesinger.
*Norwich	Jos. H. Hammond.
Norwood	Dr. J. C. Cadwallader.
*Nottingham	Dr. W. O. Jenks.
Oak Harbor	Dr. E. D. Huyck.
Oak Hill	O. S. Kent.
*Oakley	Dr. H. H. Schulze.
*Oakwood	Jno. H. Kraft.
Oberlin	S. S. Van Ausdall.
Ohio City	G. A. Balliett.
*Olmsted Falls	F. R. Gallagher.
*Orangeville	Dr. C. S. Fenton.
Orrville	Dr. A. A. Brooks.
*Osborne	H. H. McGill.
Osgood	H. C. Miller.
*Osnaburg	Wm. D. Davis.
*Ostrander	M. M. McBride.
*Ottawa	Dr. E. L. Tupper.
Ottoville	Dr. Jno. F. Ockuly.
Otway	Simon Crow.
*Owensville (Boston)	Dr. W. E. Leever.
Oxford	Dr. Ralph P. Tate.
Painesville	S. A. Haskell.
*Palestine	W. E. Kester.
*Pandora	Dr. P. D. Bixel.
Pataskala	Dr. B. D. Ashbrook.

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* In lieu of a board of health.

Place.	Health Officer.
Patterson	Peter C. Breidenback.
Paulding	Dr. E. A. Clark.
Payne	Dr. G. W. Bodey
*Peebles	Dr. J. M. Brooke.
Pemberville	Dr. E. M. Collier.
*Peninsula	M. J. Harrigan.
Perrysburg	Dr. D. R. Canfield.
Perrysville	E. F. Veach.
Phillipsburg	S. A. Mosby, Secretary.
Philo P. O. (Taylorsville)	Walter Kassell.
*Pickerington	Thos. Tussing.
Piketon	H. S. Cutler.
*Pioneer	Arthur F. Norris.
Piqua	Dr. F. E. Kitzmiller
Pittsburg P. O. (Arnettsville)	Dr. J. O. Starr.
*Plain City	J. W. Latham.
*Plainfield	N. H. Bassett.
*Pleasant City	S. W. German.
*Pleasant Hill	Dr. Judson Teeter.
*Pleasant Ridge	Dr. Geo. O. Sikes.
*Pleasantville	L. Jay Brooke.
Plymouth	Dr. J. Frank Holtz.
Poland	Dr. C. R. Justice.
Polk	Dr. W. H. Rinehart.
*Pomeroy	Dr. L. G. Gribble.
*Portage	G. R. Haight.
Port Clinton	Eugene Mennier.
*Port Jefferson	Dr. D. J. Cargill.
Portsmouth	Dr. James B. Ray.
Port Washington	Dr. F. B. Larimore.
*Port William	Dr. Paul D. Espey.
*Potsdam P. O. (New Lebanon)	H. J. Ohlinger.
Powhattan Point	S. J. Faukhanser.
*Prairie Depot P. O. (Freeport)	J. W. Coy.
Proctorville	Dr. R. E. Atkinson.
Prospect	G. F. Gast.
Put-in-Bay	Adam Heidle.
Quaker City	W. W. Dowdell.
*Quincy	Dr. N. V. Speece.
*Racine	Dr. Jno. Philson.
*Rarden	W. A. Kates.
Ravenna	Henry J. Shraeder.
Rawson	J. S. Buso.
*Reading	Leo Grau.
*Republic	Wm. T. Whiteman.
*Rendville	Wm. H. Shelton.
*Reynoldsburg	B. F. Orem.
*Richmond (Grand River P. O.)	
Richmond (Jefferson Co.)	Dr. Samuel Rothacker.
Richwood	J. F. Ledley.
Ridgway	Dr. S. S. Webster.
*Ripley	Dr. A. W. Francis.

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* In lieu of a board of health.

Place.	Health Officer.
*Rising Sun	N. P. Wirebaugh.
*Rochester	D. C. Mann.
*Rock Creek	Jay Gladding.
Rockford	Geo. Kimble.
Rockport (West Park P. O.)	
*Rocky Ridge	Jno. Krehmke.
*Rocky River	Franklin A. Rice.
*Rodgers	Wm. Green.
Rome (Stouts P. O.)	
Roscoe	Samuel T. Dobson.
*Roseville	Harvey Garrett.
*Rossburg P. O. (Rossville)	C. W. Wheeler.
Rossville (Rossburg P. O.)	
Rushsylvania	W. H. Drum.
*Rushville	Dr. W. C. Lewis.
Russelville	M. Breen.
*Sabina	J. H. Burris.
*St. Bernard	Dr. Harry Wayble.
*Saint Clairsville	Dr. S. L. West.
Saint Henry	Dr. J. A. Schirack.
Saint Louisville	Dr. L. L. Marriott.
Saint Marys	Dr. J. E. Heap.
*Saint Paris	Dr. H. Rush Zeller.
Salem	Dr. E. J. Schwatrz.
*Salesville	Jno. D. McGath.
*Salineville	Dr. Jno. A. Sapp.
Sandusky	Dr. H. C. Schoepfle.
*Sarahsville	Jonah Grimes.
*Sardinia	E. B. Hayes.
*Savannah	Simon Stahl.
Scio	Dr. G. D. Custer.
Scott	A. L. Foster.
Sebring	Virgil B. Slater.
Sedalia P. O. (Midway)	Dr. E. B. Mead.
*Senecaville	Richard Lowry.
*Seven Mile	C. B. Wilson.
Seville	Dr. P. E. Beach.
*Shanesville	Chas. E. Black.
*Shawnee	Dr. J. D. Axline.
Shelby	Dr. Roy E. Smucker.
*Sherrodsville	Peter Ledger.
Sherwood	Dr. H. C. Lindersmith.
*Shiloh	Dr. Norman P. McGay
*Shreve	Jno. C. Manson.
Sidney	Wm. C. Wyman.
*Silverton	Dr. A. A. Sprague.
*Sinking Spring	Dr. Jas. E. Chapman.
Smithfield	Ross C. Moore.
*Smithville	W. G. Zimmerman.
Somerset	Dr. Michael Krouse.
*Somerville	Geo. W. Dye.
South Bloomfield	

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* In lieu of a board of health.

Place.	Health Officer.
South Brooklyn (Brooklyn P. O.)	
*South Charleston	Albert Reeder.
South Lebanon P. O. (Deerfield)	Dr. V. T. Reynolds.
*South Point	P. G. Davidson.
*South Salem	H. C. Harper.
South Solon	Dr. Fred L. Wilson.
*South Webster	S. S. Ferguson.
*South Zanesville	Lewis Heft.
Sparta	Dr. T. A. Huggins.
*Spencerville	G. A. Rusler.
*Springboro	J. B. Haines.
Springfield	Dr. Henry Baldwin.
*Springhills	Dr. G. E. Kerns.
*Spring Valley	Dr. S. E. Dyche.
*Stafford	C. G. Robinson.
Steubenville	Jno. Welch.
Stewart	G. H. Hawk.
*Stockport	Dr. Thos. J. Lyne.
Stouts P. O. (Rome)	Dr. R. Y. Littleton.
Strasburg	Dr. J. C. Schutzbach.
Struthers	S. D. Strain.
*Stryker	Jno. E. Meek.
Sugar Creek	Mahlon Neff.
*Sugar Grove	Wm. J. Matheny.
Summerfield	Jno. Baughin.
Sunbury	Dr. G. H. Gerhardt.
Swanton	B. F. Mills.
*Sycamore	Dr. Isaiah B. Gibbs.
*Sylvania	A. D. Lewis.
*Tarlton	Benj. F. Dumm.
Taylorsville (Philo P. O.)	
*Thornville	Aldora Yontz.
Thurman P. O. (Centerville)	
Tiffin	Dr. W. H. Benner.
*Tiltonville P. O. (Grover)	Ulysses G. Bennett.
Tippecanoe City	F. N. Agenbroad.
Tiro	Dr. G. O. Blair.
Toledo	Dr. J. C. Reinhart.
*Tontogany	Dr. Thos. A. Bickerstaph.
*Toronto	Jos. Chaine.
Trenton	Edward Copp.
*Trimble	Arthur W. Dean.
Trinway	Leroy Rose.
*Trotwood	Jos. B. Brandt..
Troy	Dr. J. S. Shinn.
*Tuscarawas	Jno. Van Lehn.
Uhrichsville	Dr. J. E. Groves.
Union City	Francis Bourguin.
Uniontown (Fultonham P. O.)	
*Unionville Center	Dr. C. O. McCune.
Uniopolis	Dr. J. E. Bayliff.
*Upper Sandusky	Dr. Frederick Kennan.

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* In lieu of a board of health.

Place.	Health Officer.
Urbana	Dr. Richard T. Henderson.
*Utica	Clark D. Morris.
Van Buren	Jas. P. Grubb.
*Vandalia	Dr. W. H. Riley.
Vanlue	Dr. Jas. L. Schrote.
Van Wert	Dr. C. G. Church.
Venedocia	Dr. David Davis.
Vermillion	J. N. Delker.
Versailles	Dr. C. F. Ryan.
Vienna (Vienna X Roads P. O.)	
Vienna X Roads P. O. (Vienna)	Dr. E. A. Dye.
*Vinton	Joel A. Pugh.
Wadsworth	Dr. M. F. Miller.
Waldo	Dr. Robt. S. Dombaugh.
Wapakoneta	A. Kohler.
Warren	Dr. Geo. M. Simpson.
Warrensville P. O. (East View)	Chas. C. Murfett.
Warsaw	S. W. Willis.
*Washington	S. B. Lawrence.
Washington C. H.	J. M. McCoy.
*Washingtonville	Dr. S. V. Kennedy.
Waterloo (Pancoastburg P. O.)	
*Waterville	Dr. Burton B. Buck.
*Wauseon	Clarence B. Omsted.
*Waverly	Jas. J. Emmitt.
*Waynesburg	Wm. Waggoner.
Waynesfield	Geo. Schneider.
Waynesville	Dr. J. T. Ellis.
Webster	J. F. Byrd.
*Wellington	E. D. Snider.
Wellston	Jas. R. Ward.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	O. E. Baer.
West Cairo	Dr. Chas. E. Stadler.
*West Carrollton	Jas. Bowles.
West Elkton	Dr. Elwood Holliday.
Western Star	Fred Becker.
Westerville	Dan Dusenberry.
*West Farmington	Albert Ostrom.
West Jefferson	David Bussick.
West Lafayette	Jno. Bell.
*West Leipsic	W. C. Miller.
*West Liberty	Dr. G. B. Hale.
*West Manchester	Geo. L. Bruner.
*West Mansfield	Dr. H. A. Skidmore.
West Millgrove	Dr. C. B. Hatfield.
*West Milton	Cyrus Long.
Weston	Dr. J. W. Williams.
*West Park P. O. (Rockport)	Dr. Chas. L. Wood.
West Rushville	Wm. Kerr.
*West Salem	Dr. E. C. Raudebaugh.
West Union	Dr. Jas. W. Bunn.

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* In lieu of a board of health.

Place.	Health Officer.
*West Unity	Jos. Fisher.
Wharton	Wm. Krieder.
*Whitehouse	J. F. Lehman.
Wilkesville	Dr. G. W. Martin.
*Williamsburg	Dr. G. L. Hines.
Williamsport	Dr. D. H. Marcy.
Willoughby	Jas. Maloney.
Willow P. O. (Newburg Heights)	Dr. F. E. Farrar.
*Willshire	Dr. J. F. Shaffner.
Wilmington	Dr. E. C. Briggs.
Wilmot	Dr. O. Curtis Ricksecker.
*Winchester (Adams Co.)	Dr. T. H. Troute.
Winchester (Preble Co) (See Gratis P.O)	
Windham	H. J. Higley.
*Woodsfield	Louis Hoeffler.
Woodstock	D. P. Smith.
Woodville	Dr. R. M. Durbin.
Wooster	Dr. J. W. Lehr.
*Worthington	T. E. Albert.
Wren	
Wyoming	Dr. Paul Gillespie.
Xenia	Dr. R. H. Grube.
Yellow Springs	Wm. Loe.
*Yorkshire	Ira Hess.
Youngstown	Dr. H. E. Welch.
Zaleski	J. W. Crist.
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. G. W. McCormick.
*Zoar	Christian Ruof.

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* In lieu of a board of health.

Abstract of Reports

OF

DEATHS AND THEIR CAUSES

During 1908

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

Cities.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.										
				Under One.	One to Five.	Typhoid Fever	Malarial Fever	Smallpox.	Measles.	Scarle Fever.	Whooping Cough	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.
Akron	60,000	642	10.70	....	....	9	1	..	...	13	4	14	12	..	13	40
Alliance	15,000	182	12.13	7	4	7	.	..	..	6		5	6	..	10	14
Ashtabula	18,000	262	14.55	50	24	24	.	..	1	3		2	1	1	1	13
Bellaire	15,000	189	12.60	31	25	3	.	..	..	..		8	...	..	3	23
Bellefontaine	7,611	124	16.29	14	17	...	.	..	..	..		..	...	..		.....
Bolwing Green	5,000	30	6.00	....	....	1	.	..	...	1		..	3	..		.....
Bucyrus	9,000	79	8.78	3	1	2	.	..	...	1		..	2	..	1	9
Cambridge	15,000	156	10.40	27	11	4	.	..	..	..		1	1	..	2	15
Canal Dover	7,000	64	9.14	12	9	2	.	..	1	2	2	2	2	..		3
Canton	45,000	456	10.01	64	28	5	.	..	1	4	2	4	4	..	11	38
Chillicothe	17,000	206	12.12	15	9	6	.	..	..	..	8	..	...	2	7	35
Cincinnati	380,000	6,448	16.96	945	421	64	2	3	53	31	28	54	111	9	13	860
Circleville	7,000	99	14.14	12	2	1	.	..	..	..		..	2	1		11
Cleveland	500,000	7,177	14.35	1,801	549	64	2	..	41	34	22	83	43	6	54	634
†Columbus	185,000	2,487	13.44	336	111	170	1	..	4	1	14	12	20	7	12	278
Conneaut	7,200	68	9.44	....	3	1	.	..	..	..		3	1	..		.....
Coshocton	10,000	109	10.90	....	....	10	.	..	2	1	3	..	1	..	..	9
Dayton	125,000	1,471	11.77	235	60	16	.	..	..	2	3	7	6	5	16	181
Defiance	9,000	74	8.22	5	6	1	.	..	..	..		..	1	..		9
Delaware	10,000	114	11.40	10	16	6	.	..	..	..		1	2	4		8
East Liverpool	20,000	262	13.10	32	8	15	.	..	..	..		..	2	2	1	34
Elyria	15,000	127	8.47	19	8	2	.	..	..	..		..	...	..	3	17
Findlay	18,000	168	9.33	20	6	...	.	..	...	1	2	...	1	1		7
Fostoria	11,000	93	8.44	5	3	3	.	..	..	..	4		1	1		15
Fremont	10,000	73	7.30	....	1	3	.	..	..	..			...	..	3	10
Galion	8,500	92	10.82	8	3	1	.	..	..	..			5	..	1	14
Gallipolis	5,000	79	15.80	5	1	...	.	..	..	..			7	4	..	.....
Greenville	7,000	80	11.43	2	....	2	.	..	..	..	2		2	1	1	6
Hamilton	35,000	471	13.46	30	19	9	.	..	1	..	5	5	3	1	2	48
Ironton	15,000	143	9.53	13	6	9	.	..	..	..			2	..	..	19
Kenton	....	......	......	.....	.....	...	.	..	..	..			...	..	..	.....
Lancaster	16,280	137	8.42	10	6	9	1	..	..	..			7	..	2	21
Lima	30,000	330	11.00	47	19	2	.	..	1	1			2	2	16	35
Lorain	32,000	314	9.81	110	24	5	.	..	..	..		9	3	..	2	25
Mansfield	22,000	238	10.82	....	....	2	.	..	..	3		5	1	..	2	11
Marietta	15,000	234	15.60	19	5		.	..	..	..			...	..	..	29
Marion	....	......	......	.....	.....		.	..	..	..			...	..	..	.....
Martins Ferry	10,000	148	14.80	27	17	10	.	..	2	..	5		...	2	1	18
Massillon	14,400	134	9.31	23	6		.	..	1	..			...	..	..	12
Middletown	12,000	135	11.25	22	8	2	.	..	..	1		3	2	..	3	23
Mt. Vernon	12,000	118	9.83	2	6	4	.	..	..	1			...	..	2	7
Nelsonville	7,000	54	7.71	8	9		.	..	..	..		4	...	..	1	2
Newark	26,500	309	11.66	45	19	5	.	..	2	..	2	5	6	..	3	27
New Philadelphia	10,000	84	8.40	....	....	6	.	..	..	1		.	...	..	..	6
Niles	9,000	119	13.22	....	....	3	.	..	..	..		6	...	..	..	2
Norwalk	9,000	78	8 67	....	....		.	..	..	..			...	..	..	12
Norwood	20,000	107	5.35	7	4		.	..	..	..			...	2	1	9
Painesville	6,000	99	16.50	2	3	2	.	..	..	..			2	..	..	7
Piqua	15,000	144	9.60	13	4	3	.		..	..		2	1	..	3	15
Portsmouth	....	......	......	.....	.....		.		..	..			...	..	..	.....
St. Marys	6,000	62	10.33	10	4		.		1	..			...	..	1	6
Salem	10,000	81	8.10	11	5	2	.		..	..			...	..	..	2
Sandusky	22,000	377	17.13	15	10	35	.		..	..		2	4	..	5	38
Sidney	6,000	77	12.83	12	2		.		..	..			4	..	1	5
Springfield	45,000	551	12 24	....	....	9	.		..	..	4	4	6	..	5	56
Steubenville	....	......	......	.....	.....		.		..	..			...	..	..	.....
Tiffin	14,000	108	7 71	9	3		.		..	..		3	...	..	..	9
Toledo	187,453	2,102	11.20	383	112	62	.		2	13	3	29	30	1	24	189
Troy	....	......	......	.....	.....	...	.	..	..	..			...	..	..	.....
Urbana	7,020	86	12.25	5	....	2	..	..	...	..			...	..	..	5
Van Wert	8,000	65	8.12	....	....	1	..	..	...	..			...	..	2	6
Warren	....	......	......	.....	.....	...	..	..	...	..				..	....	.....
Washington C. H.	5,756	136	23.63	13	5	4	..	..	...	..				3	....	15

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

General Diseases.						Diseases of Respiratory System.												
Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellula Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
5	37	1	40	104	71	59	15	51	29	1	....	..	2	29	50	34	8	92
2	14	2	8	15	16	8	.....	2	6	1	....	..	...	6	15	21	8	10
....	6	2	12	29	23	25	.....	33	11	5	2	..	...	26	8	32	2	36
11	5	..	4	19	23	22	2	16	2	2	1	1	1	11	7	23	2	8
....	.....	..	...	.....	.....	.....	.....	.....	....	...	...	..	...	.....	.....	.....	...	.....
...	4	2	1	4	8	.....	.....	1	....	...	...	..	...	.....	1	4	...	.....
1	6	..	...	15	7	8	2	5	8	...	...	..	...	.....	5	5	2	6
3	10	..	10	21	20	13	5	13	12	...	...	..	...	6	1	14	5	8
....	4	..	...	8	4	3	1	8	8	2	2	..	...	1	2	5	2	2
5	26	1	13	64	65	48	8	33	27	4	1	..	8	33	10	31	10	31
12	.....	..	...	24	12	16	4	17	14	...	...	..	...	.....	12	10	16	[illegible]
92	333	20	172	625	670	631	281	760	537	62	24	14	...	355	211	433	...	.....
....	7	..	2	10	10	7	1	4	10		.	..	...	7	3	7	2	6
64	334	11	231	908	743	559	394	1,008	410	5	5	12	49	447	308	511	139	546
50	134	4	50	300	288	191	79	209	169	5	1	2	10	131	111	183	31	130
6	3	..	...	16	12	6	.....	1	7		.	1	...	3	4	1	3	10
1	4	..	4	7	6	13	1	7	10	3		..	...	3	10	4	9	10
8	77	4	30	202	229	134	36	126	82	3	14	..	7	94	35	96	58	100
....	4	..	3	8	5	9	6	4	5	2		..	2	1	5	7	...	4
2	4	6	...	13	10	.....	3	10	3		.	1	...	4	12	2	7	6
....	10	..	...	35	17	28	5	52	12	2	.	..	1	....	9	25	11	.....
....	7	1	7	13	16	14	1	7	6		.	..	...	1	10	9	12	.....
15	13	3	1	26	20	13	3	23	11		.	..	...	....	6	10	12	19
...	2	..	...	12	17	4	3	6	6		.	..	...	5	6	5	1	8
...	4	..	1	2	10	4	.....	7	7		.	..	...	....	12	7	2	2
3	5	..	7	19	8	7	1	5	7		1	..	...	....	2	6	...	6
6	4	..	...	17	10	2	2	4	1		.	..	...	....	4	8	9	9
1	7	1	...	13	16	4	1	12	7		.	1	...	....	3	.....	...	9
7	20	1	4	69	52	54	14	35	37	4	1	..	5	24	22	46	2	42
....	3	..	...	19	22	11	1	8	17		.	5	2	5	3	13	3	12
....	.....	..	...	.....	.....	.....	.....	.....	....		.	..	...	....	.....	.....	...	.....
2	7	..	3	21	19	9	6	7	9		.	..	2	2	4	2	1	17
2	16	4	...	59	38	25	9	35	21	3	1	..	...	18	11	18	9	11
4	9	..	11	28	20	26	4	50	19	8	.	..	3	46	....	38	4	28
....	6	..	...	26	25	15	2	1	14	2	.	2	...	....	13	9	99	.....
....	7	..	1	29	9	14	.....	7	7		.	..	...	....	21	27	66	19
....	.....	..	...	.....	.....	.....	.....	.....	....		.	..	...	....	.....	.....	...	.....
....	1	..	10	25	11	12	6	10	4	1	.	..	...	....	.....	14	...	15
....	3	..	6	21	15	10	7	15	6	3	2	..	...	1	12	11	5	1
....	4	2	1	15	18	14	1	15	14	4	1	1	1	....	.....	3	6	.....
....	6	..	1	20	15	18	2	13	8	2	.	..	...	....	7	9	2	12
7	3	1	2	4	4	12	.....	6	1	1	.	..	...	1	1	4	...	5
10	15	2	7	36	28	21	10	25	18	7	4	1	4	19	11	33	8	.....
2	3	..	3	8	14	12	2	6	7	2	.	2	...	....	3	6	1	5
....	.....	..	5	2	2	9	.....	1	3		1	..	...	....	6	4	5	2
....	5	..	...	12	17	3	1	3	13	3	..	..	...	....	3	2	4	.....
....	7	..	6	19	15	8	5	4	11	1	1	..	...	1	3	12	2	5
....	6	..	10	16	13	5	.....	.....	3	5	..	1	2	....	7	15	4	1
....	10	2	8	14	29	15	.....	12	5	2	..	..	...	....	18	3	2	.....
....	.....	..	...	.....	.....	.....	.....	.....	....	..	..	..	...	....	.....	.....	...	.....
2	3	..	...	8	12	8	5	4	2	1	..	..	1	3	1	4	...	9
4	4	1	6	4	13	12	6	5	4	1	..	..	...	11	....	6	...	11
....	18	..	10	58	44	14	25	24	20	7	..	..	...	....	36	30	7	16
2	3	..	2	12	10	5	1	7	9	1	..	..	...	7	1	5	...	2
4	26	2	28	78	62	47	11	77	53	9	..	..	...	....	41	19	10	53
....	.....	..	...	.....	.....	.....	.....	.....	....	..	..	..	...	....	.....	.....	...	.....
1	8	..	...	24	30	5	4	8	7	..	..	..	...	4	.....	2	1	.....
21	92	8	66	219	207	151	61	253	144	24	8	7	11	155	123	156	43	148
....	.....	..	...	.....	.....	.....	.....	.....	....	..	..	..	...	....	.....	.....	...	.....
1	4	1	8	13	14	10	2	5	6	1	..	..	...	....	2	8	1	2
....	7	1	5	14	6	6	.....	6	5	..	1	..	1	1	.....	2	...	.....
....	.....	..	...	.....	.....	.....	.....	.....	....	..	..	..	...	....	.....	.....	...	.....
....	5	1	18	16	22	17	4	3	4	...	3	..	...	1	1	10	6	11

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908—CITIES—Concluded.

Cities.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.										
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.
Wellston	9,000	96	10.67	15	5	2	..	..	...	...	3	1	...	..	....	20
Wellsville	9,000	86	9.56	3	8	3	..	..	...	...	2	1	2	..	2	10
Wooster	....	......	.....	.....	.....	...	..	..	...	...	...	...	...	..	.....	.....
Xenia	10,000	174	17.40	.....	27	4	..	..	...	...	1	...	...	..	3	22
Youngstown	65,000	941	14.48	269	98	25	..	..	8	5	11	7	3	8	6	61
Zanesville	27,000	375	13.89	24	21	11	..	..	...	2	...	3	5	1	6	45
Totals	2,288,720	30,124	13.16	4,805	1,781	667	7	3	121	127	141	292	320	64	247	3,100

*By health officer in 1907.
†Including 331 non-residents who died in the city.

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908—CITIES—Concluded.

General Diseases.				Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
....	5	..	...	7	9	14	1	4	1	...	....	..	...	.....	2	6	20	6
2	3	..	...	10	16	12	.....	10	3	...	....	..	...	.....	3	7	...	4
....	......	..	...	......	......	......	.....	......	......	...	....	..	...	.....	......	......	...	.....
1	8	..	7	19	26	12	4	13	7	...	....	1	3	6	30	7	...	.....
11	20	..	29	89	73	114	37	143	37	14	4	2	9	71	56	84	14	103
....	15	2	20	53	41	22	12	33	23	3	3	..	...	.....	39	33	3	36
370	1,416	86	873	3,596	3,287	2,570	1,097	3,272	1,949	266	103	54	124	1,539	1,342	2,141	679	1,663

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	General Diseases. Malarial Fever.	General Diseases. Smallpox.	General Diseases. Measles.	General Diseases. Scarlet Fever.	General Diseases. Whooping Cough.	General Diseases. Diphtheria and Croup.	General Diseases. Grippe.	General Diseases. Dysentery.
Adamsville	220	2	9.09	...	...	1	...	...	...	...	...	...	...	...
Alexandria	400	5	12.50	...	...	...	...	...	...	...	...	...	...	...
Alger	1,000	6	6.00	...	...	...	...	...	...	...	...	1	...	...
Amelia	450	9	20.00	...	...	...	...	...	...	...	...	...	...	...
Anna	550	6	10.90	...	...	...	...	...	...	...	...	...	...	...
Ansonia	1,000	8	8.00	...	...	...	...	...	...	...	...	...	...	...
Antwerp	1,200	11	9.17	1	1	...	...	...	...	...	...	...	...	...
Arcanum	1,400	17	12.14	...	...	1	...	...	...	...	...	...	...	...
Archbold	1,200	3	2.50	...	...	...	...	...	...	...	...	...	...	...
Arlington	1,000	4	4.00	2	...	1	...	...	...	...	...	...	...	1
Arnettsville	225	2	8.89	...	...	1	...	...	...	...	...	...	...	...
Ashland	8,000	67	8.37	4	3	...	...	...	2	...	1	...	4	...
Ashville	1,200	10	8.33	2	...	...	...	...	...	4	...	...	...	...
Athalia	300	3	10.00	1	...	...	...	...	...	...	...	...	...	...
Athens	6,000	53	8.83	1	5	1	...	...	...	...	...	1	...	...
Avon	2,500	18	7.20	...	...	1	...	...	...	...	...	...	...	...
Bainbridge	1,000	12	12.00	...	1	1	...	...	...	...	...	...	1	...
Baltimore	650	1	1.54	...	...	1	...	...	...	...	...	...	...	...
Barberton	9,500	97	10.21	24	5	6	...	...	1	...	...	1	...	...
Bay	600	1	1.67	...	...	...	...	...	...	...	...	...	...	...
Beaver	400	4	10.00	3	...	...	...	...	...	...	...	...	...	...
Bedford	2,300	23	10.00	...	...	2	...	...	...	...	...	...	...	...
Belle Center	1,200	20	16.67	...	1	...	...	...	...	...	...	...	...	...
Belle Valley	600	11	18.33	5	1	...	...	...	...	...	...	1	...	...
Bellville	1,000	4	4.00	...	...	...	...	...	...	...	...	...	...	...
Belpre	1,600	16	10.00	...	1	1	1	...	...	...	...	...	2	...
Berea	2,500	13	5.20	3	...	...	...	...	...	...	...	...	...	...
Bergholz	1,000	10	10.00	...	2	...	...	...	...	...	...	1	...	...
Berlin	500	1	2.00	...	...	...	...	...	...	...	...	...	...	...
Berlin Heights	800	3	3.75	...	...	...	...	...	...	...	...	...	...	...
Bethel	1,200	13	10.83	...	...	1	...	...	...	...	...	...	...	...
Bettsville	490	6	12.24	...	...	...	...	...	...	...	...	1	...	...
Blanchester	2,200	11	5.00	...	...	1	...	...	1	...	...	...	...	...
Bloomdale	700	8	11.43	...	...	...	...	...	...	...	...	...	...	...
Bloomingburg	650	3	4.61	...	...	...	...	...	...	...	...	...	...	...
Bloomville	900	8	8.88	...	...	...	...	...	...	...	...	...	...	...
Boston	300	1	3.33	...	...	...	...	...	...	...	...	...	...	...
Botkins	600	4	6.67	...	...	...	...	...	...	...	...	...	...	...
Bowersville	450	6	13.33	...	...	...	...	...	...	...	...	...	...	...
Bradford	1,800	28	15.56	7	6	...	...	...	...	...	1	3	...	...
Bradner	900	8	8.89	...	...	...	...	...	...	...	...	...	...	...
Brooklyn Heights	365	7	19.18	...	1	...	...	...	...	...	...	1	...	...
Bryan	4,000	37	9.25	4	...	...	...	...	...	1	...	...	...	...
Buchtel	1,400	11	7.86	1	...	...	...	...	...	...	...	...	...	...
Buckeye City	250	1	4.00	...	...	...	...	...	...	...	...	...	...	...
Burton	800	13	16.25	...	2	...	...	...	...	...	...	...	...	...
Butler	1,000	19	19.00	...	...	...	...	...	...	...	...	...	...	...
Cadiz	2,200	28	12.73	...	2	...	...	...	...	...	2	...	...	...
Caldwell	2,000	9	4.50	...	...	1	...	...	...	...	...	...	...	...
Caledonia	670	20	29.85	1	...	2	...	...	...	...	...	...	...	...
Camden	1,000	13	13.00	1	...	...	...	...	...	...	...	...	...	...
Canal Fulton	1,100	22	20.00	1	...	...	...	...	...	...	...	...	...	1
Canal Winchester	1,000	6	6.00	...	...	...	...	...	...	...	...	...	...	...
Cardington	2,000	13	6.50	...	...	...	...	...	...	...	...	...	1	...
Carey	2,500	55	22.00	...	...	...	...	...	...	...	...	...	...	...
Carlisle	150	1	6.67	...	...	...	...	...	...	...	...	...	...	...
Carrollton	2,200	17	7.73	...	...	1	...	...	...	...	...	...	...	...
Carthage	3,500	29	8.29	1	1	...	...	...	...	...	...	...	...	...
Casstown	300	4	13.33	...	...	...	...	...	...	...	...	...	...	...
Cedarville	1,200	20	16.67	...	...	...	...	...	...	...	...	...	3	...
Celina	4,500	41	9.11	5	1	...	2	...	...	...	...	...	...	...
Centerburg	900	13	14.44	...	...	...	...	...	...	...	...	...	...	...
Centerville	250	7	28.00	...	...	...	...	...	...	...	...	...	...	...
Chagrin Falls	2,500	24	9.60	1	1	1	...	...	1	1	...	...	...	1
Chambersburg	200	4	20.00	...	...	...	...	...	...	...	...	...	...	1
Chardon	1,600	33	20.60	...	...	...	...	...	...	...	...	...	2	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Form of Tuberculosis.	Cancer	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Disease of Digestive System.	Diseases of Genito-urinary System	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
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....			2				2	1	....	....	....	....	....	3	....	....	....	....	1	....
....	2		2			2	2	3	....	3	1	....	....	....	....	....	1	....	....	1
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2	4	1	2			6	14	6	....	10	5	....	....	....	....	....	2	5	1	4
....	4						....	....	....	....	1	....	....	....	....	....	....	1	....	....
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2	8		4			7	7	5	....	6	4	....	....	....	....	....	4	1	2	1
....			2			2	2	3	3	1	....	....	....	....	....	1	2	....	....	1
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....	2						3	4	....	....	....	1	....	....	....	....	3	1	1	2
1	3		2				2	....	....	3	2	2	....	....	....	2	....	1	....	....
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....	4					2	....	1	....	....	1	....	....	....	....	....	2	2	....	....
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....	1					3	1	1	....	1	1	....	....	....	....	....	....	....	....	....
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....	2					3	4	....	1	4	1	1	1	....	....	3	....	3	....	4
....							1	2	....	1	....	....	....	....	....	....	....	1	....	....
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....	3		2			6	8	....	....	4	3	....	....	....	....	1	1	6	2	1
....	4						1	2	....	....	1	....	....	....	....	....	2	....	....	7
....							....	....	....	....	....	....	....	....	....	....	1	....	....	1
....			3				3	....	1	2	....	....	....	....	....	....	3	....	1	....
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....	3		3			4	5	1	....	....	3	....	....	....	....	1	5	1	....	1
....						2	1	....	....	2	....	....	....	....	....	2	....	....	1	2
....							2	2	....	4	1	....	....	2	....	....	....	4	1	....
2							1	3	....	1	3	....	....	1	....	....	....	....	....	....
1			3			1	2	2	....	....	1	1	....	....	....	1	5	2	1	1
1						2	2	....	....	....	1	....	....	....	....	....	....	....	....	....
....	3						2	1	2	1	....	....	....	....	....	....	1	1	....	2
....	3		3			6	14	8	....	3	2	....	1	4	....	....	2	1	8	....
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....	2					4	2	....	....	....	2	....	....	....	....	....	3	1	1	1
2	2		2			3	6	3	....	2	3	....	....	....	....	....	1	2	2	3
....						1	....	....	....	....	....	1	....	....	....	....	2	....	....	1
....	2					2	4	....	....	....	3	....	....	....	....	....	3	2	....	....
6	2		4			8	1	1	1	8	1	....	1	....	....	....	3	....	2	9
....	1						4	3	....	....	1	....	....	....	....	....	3	....	....	....
....						1	2	2	....	1	1	....	....	....	....	....	....	....	....	....
....						4	3	....	....	6	1	1	....	....	....	....	2	1	....	....
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....					23	2	2	3	1	....	....	....	....	....	....	....	....	....	....	....

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908. —Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Cheviot	2,000	7	3.50	...	...	...	...	...	...	...	...	...	...	...
Clarksville	600	5	8.33	...	...	...	...	...	...	...	...	...	...	...
Cleves	1,500	19	12.67	1	...	...	...	...	...	...	...	...	...	...
Clifton	250	4	16.00	...	...	...	...	...	...	...	...	...	1	...
Clyde	3,000	50	16.67	...	...	2	...	...	...	...	...	...	...	...
Coalgrove	1,000	22	22.00	3	6	2	...	...	...	...	1	1	...	1
College Corner	500	6	12.00	...	...	...	...	...	...	...	...	...	...	1
College Hill	1,500	19	12.67	...	...	...	...	...	...	...	...	1	2	...
Collinwood	8,000	234	29.25	34	8	2	...	...	...	...	...	...	1	...
Columbus Grove	2,000	20	10.00	...	2	...	...	...	1	...	...	1	...	...
Congress	200	5	25.00	1	...	...	...	...	...	...	...	...	...	...
Corlett	3,000	4	1.33	1	2	...	...	...	...	...	...	1	...	...
Corning	1,870	17	9.09	...	...	1	...	...	...	...	...	1	...	...
Cortland	800	6	7.50	...	...	...	...	...	...	...	...	...	...	...
Crestline	4,000	65	16.25	5	7	...	...	...	...	...	...	1	3	...
Creston	1,200	11	9.17	2	2	...	...	...	...	...	...	...	...	...
Cridersville	600	7	11.67	...	...	5	...	...	...	...	...	...	...	...
Crooksville	3,000	23	7.67	...	...	1	...	...	2	...	...	...	...	...
Custar	400	7	17.50	1	...	...	...	...	...	...	...	...	...	...
Cuyahoga Falls	4,000	38	9.50	...	...	1	...	...	...	...	...	...	...	...
Dalton	800	7	8.75	...	...	...	...	...	...	...	...	...	...	...
De Graff	1,200	14	11.67	...	...	...	...	...	...	...	...	...	...	...
Delhi	1,000	11	11.00	...	...	...	...	...	...	...	...	...	...	...
Dell Roy	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Delphos	5,000	83	16.60	7	2	1	...	...	...	...	1	...	2	2
Dennison	4,500	52	11.55	7	1	3	...	...	...	...	...	1	1	2
Deshler	2,000	6	3.00	...	...	...	...	...	...	...	...	...	...	...
Dexter City	300	4	13.33	1	...	...	...	...	...	...	...	...	...	1
Dunkirk	1,300	18	13.84	1	...	...	...	...	...	...	...	...	...	...
Dupont	350	5	14.29	...	...	...	...	...	...	...	...	...	...	...
East View	400	7	17.50	...	...	...	...	...	...	...	...	...	...	...
Eaton	3,800	34	8.95	...	2	...	...	...	...	...	...	...	1	1
Edgerton	1,200	5	4.17	...	...	...	...	...	...	...	...	...	...	...
Edison	500	5	10.00	1	1	...	...	...	...	...	...	...	...	...
Edon	800	8	10.00	1	...	...	...	...	...	...	...	...	...	1
Eldorado	400	3	7.50	...	...	...	...	...	...	...	...	...	1	...
Elmore	1,200	18	15.00	...	1	...	...	...	...	...	...	1	...	...
Elmwood Place	3,500	24	6.86	1	3	...	...	...	...	...	1	...	1	...
Enon	300	3	10.00	...	...	...	...	...	...	...	...	...	...	...
Euclid	2,200	5	2.27	...	1	...	...	...	...	...	...	...	...	...
Fairfield	300	3	10.00	...	...	...	...	...	...	...	...	...	...	...
Fairport	2,300	27	11.74	...	...	3	1	...	...	...	...	...	...	...
Farmersville	600	3	5.00	...	...	...	...	...	...	...	...	...	...	...
Fayette	1,000	8	8.00	...	...	...	...	...	...	...	...	...	...	...
Fayetteville	400	7	17.50	...	...	...	...	...	...	...	...	...	...	...
Felicity	600	12	20.00	...	...	...	...	...	...	...	...	...	...	...
Fletcher	500	6	12.00	...	...	...	...	...	...	...	...	...	...	...
Flushing	1,200	23	19.17	1	2	...	...	...	...	...	...	1	...	...
Fort Jennings	330	1	3.03	...	...	...	...	...	...	...	...	...	...	...
Frankfort	800	12	15.00	1	...	...	...	...	...	...	...	...	...	1
Franklin	3,000	32	10.67	3	4	...	...	...	...	...	1	1	...	...
Fredericksburg	500	4	8.00	...	...	...	...	...	...	...	...	...	...	...
Fredericktown	1,100	12	10.91	...	...	...	...	...	...	...	...	...	...	...
Freeport	700	16	22.86	1	...	2	...	...	...	...	...	...	...	...
Garrettsville	1,200	15	12.50	...	...	...	...	...	...	...	...	...	...	...
Geneva	2,300	49	21.30	1	2	1	...	...	...	...	...	...	1	...
Genoa	1,200	16	13.33	1	...	...	...	...	...	...	...	...	...	...
Georgetown	2,000	6	3.00	...	1	...	...	...	...	...	...	...	1	1
Gettysburg	275	3	10.91	1	...	...	...	...	...	...	...	1	...	...
Geyer	165	3	18.18	...	...	...	...	...	...	...	...	...	...	...
Gibsonburg	2,000	17	8.50	3	...	3	...	...	...	...	...	...	1	...
Girard	3,800	51	13.42	12	9	...	...	...	...	...	...	...	...	...
Glendale	1,800	10	5.55	...	...	...	...	...	...	...	...	...	...	...
Grafton	1,200	8	6.67	...	...	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
	1					2	1	1									2			
							3					1						1		
	1			1		1	4	1		2	5			1		1			2	
						2				1										
	2		3		2	14	9	1		3	3						5	3	3	
	5					2		1		6						2	1			1
		1					2	1				1								
		1	1	2	4	3	1			1	3									
	2		3			8	9	10	4	16	5	4			1	3	5	153	5	3
	5		2								2						6	2	1	2
			1			3												1		1
								1		1	1									
						2	3	3		2	1						2	2		
				1		1	2		1								1			
	5	6	3		15	6	6	5		5	3						2	4	1	8
			2		1	3	2	1	1								1			1
							2													
	2		1	1		2	2	4		1	1						3	2	1	6
				1				2		1	2							1		1
	4		1													3	3	2		1
						2	1			1	2						1			
	3					2		3			3						2	1		
	1					1	2		1	2	2	1					1			
	2																			
	12	4	2	1		10	5	9	10	10	5						2	3	4	
2	6		2			5	6	9	1	4	4	2				1		3		2
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	7		1			5	5	2	1	4	3			1			1		2	
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			1				1			2									1	1
	1		1			1	2										2			3
			1				1													1
	1	1	2		4	1	1			1	5	1								
	2				2	4	1	2	1	1	2		1				1	5		2
			1	1		1														
										1	1						2	1		
						1			1		1									
	1	4			1	4				2	3	4					2		2	6
	1															1	1			
			1		1		1	1	1								2	1		
	1						3										3			
1	1					1	2	1		2				2			1	1		
	1					1	1				2	1								
			1				6	1		7	1			1				2	2	1
																	1			
	2					1	1						1	1			2		1	
	6		2	1		3	3	2		3	2					2	4	2		1
			2								2									
	1	1		1		2	3				2						1	1		1
	2							2		2	4						3	1		
	1					4	4		1	2							2	1		
3	3	1	2	1		6	8	6		2	4	1				1	5	4		2
	4			1		2		1								1	2	2	1	
	1					2		1												
											2									
	1									1		1								1
		1	2			1		2	1	1							2		3	1
	8		1			7	2	5	1	6		1				3	5	7	5	10
				1		1	1	2		1	2						2			
	1		1				1										4	1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Greenfield	4,500	87	19.33	...	...	1	...	...	...	...	...	...	3	1
Greenwich	1,000	10	10.00	...	...	...	...	...	...	...	...	...	...	...
Gordon	300	1	3.33	...	...	...	...	...	...	...	...	...	...	...
Hamden	1,035	4	3.86	...	...	...	...	...	...	...	...	...	...	...
Hanging Rock	600	6	10.00	...	...	...	...	...	...	...	...	...	...	...
Hanover	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Harrod	500	6	12.00	2	...	...	...	...	...	...	...	1	...	...
Hartford (Licking County)	400	6	15.00	...	...	...	...	...	...	...	...	...	...	...
Hartwell	2,800	19	6.79	2	...	...	...	...	...	...	...	...	...	...
Harveysburg	450	6	13.33	...	...	...	...	...	...	...	...	...	...	...
Haviland	275	2	7.27	1	...	...	...	...	...	...	...	...	...	...
Hemlock	600	5	8.33	...	...	...	...	...	...	...	...	1	...	...
Higginsport	600	1	1.67	...	...	...	...	...	...	...	...	...	...	...
Holgate	1,275	17	13.33	3	1	1	...	...	...	...	...	...	...	...
Hollansburg	400	6	15.00	...	...	...	...	...	...	...	...	...	...	...
Holloway	700	2	2.86	...	...	...	...	...	...	...	...	...	...	...
Huron	2,300	25	10.87	4	...	...	...	...	...	...	...	...	1	...
Ithaca	250	10	40.00	1	...	1	...	...	...	...	...	...	...	1
Jackson	6,500	70	10.77	6	5	...	...	...	...	...	1	1	...	...
Jackson Center	1,000	4	4.00	...	1	...	...	...	...	...	...	...	...	...
Jamestown	1,500	23	15.33	2	2	...	...	...	...	...	...	...	...	...
Jefferson	1,550	18	11.61	...	...	1	...	...	...	...	...	...	...	...
Jeffersonville	800	8	10.00	...	...	1	...	...	...	...	...	...	...	...
Jenera	246	4	16.26	...	...	...	...	...	...	...	...	...	...	...
Jeromeville	350	5	14.28	...	...	...	...	...	...	...	...	...	...	...
Kelley's Island	1,200	13	10.83	...	1	1	...	...	...	...	...	1	...	...
Kenmore	1,000	5	5.00	...	...	...	...	...	...	...	...	...	...	...
Kettlersville	150	2	13.33	...	...	...	...	...	...	...	...	...	...	...
Kimbolton	280	5	17.86	...	...	...	...	...	...	...	...	...	...	...
Kirby	150	1	6.67	...	...	...	...	...	...	...	...	...	...	...
Kossuth	125	4	32.00	...	...	...	...	...	...	...	...	...	...	...
La Grange	600	6	10.00	...	...	...	...	...	...	...	...	...	...	...
Lakewood	12,000	58	4.83	...	...	1	...	...	...	...	...	...	...	...
La Rue	1,000	10	10.00	2	...	...	...	...	...	...	...	...	...	...
Latty	500	1	2.00	...	...	...	...	...	...	...	...	...	...	...
Laura	385	3	7.79	...	...	...	...	...	...	...	...	...	...	...
Lebanon	4,000	33	8.25	...	...	...	...	...	...	...	...	...	1	1
Leesburg	800	6	7.50	...	...	...	...	...	...	...	...	...	...	...
Leesville	500	2	4.00	...	...	...	...	...	...	...	...	...	...	...
Leetonia	3,000	31	10.33	3	3	2	...	...	...	...	...	...	1	1
Lewisburg	700	10	14.29	...	...	...	...	...	...	...	...	...	...	...
Lewisville	278	1	3.60	...	...	...	...	...	...	...	...	...	...	...
Limaville	147	2	13.60	...	...	...	...	...	...	...	...	...	...	...
Lisbon	3,000	1	.33	...	...	...	...	...	...	...	...	1	...	...
Lockbourne	400	4	10.00	1	...	...	...	...	...	...	...	...	...	...
Lockland	3,200	37	11.56	...	...	...	...	...	...	...	...	...	...	...
Lodi	1,200	10	8.33	...	...	...	...	...	...	...	...	...	...	...
Logan	4,500	83	18.44	10	4	2	...	...	1	...	1	1	3	2
London	4,000	40	10.00	3	1	1	...	...	...	...	...	...	1	...
Loramie	500	5	10.00	2	1	...	...	...	...	...	...	...	...	...
Louisville	1,800	23	12.77	...	...	...	...	...	...	...	...	...	...	1
Loveland	1,800	8	4.44	...	...	...	...	...	...	...	...	...	...	...
Lowell	500	7	14.00	...	...	...	...	...	...	...	...	...	...	...
Lucas	400	3	7.50	...	...	...	...	...	...	...	...	...	...	...
McArthur	1,000	11	11.00	...	...	...	...	...	...	...	...	...	...	...
McComb	1,300	10	7.69	1	...	...	...	...	...	1	...	...	...	...
McConnelsville	2,000	24	12.00	1	...	...	...	...	...	...	...	...	...	...
Madison	1,000	9	9.00	...	...	...	...	...	...	...	...	...	...	...
Madisonville	6,200	34	5.48	...	...	...	...	...	...	...	...	...	...	...
Maineville	500	3	6.00	...	...	...	...	...	...	...	...	...	...	...
Martinsville	400	4	10.00	...	...	...	...	...	...	...	...	...	...	...
Maumee	2,800	32	11.43	2	...	...	...	...	...	...	...	...	2	...
Mechanicsburg	1,616	25	15.47	...	...	1	...	...	...	...	...	1	1	...
Medina	3,000	34	11.33	2	2	...	...	...	...	...	...	...	...	...
Melrose	450	9	20.00	3	...	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
...	8	...	2	1	...	3	12	2	1	4	9	2	...	...	...	...	2	2	8	5
...	...	...	2	...	1	1	4	...	1	1	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	2	...	...	...
...	...	...	...	...	...	...	2	2	...	1	1	...	...	...	...	...	...	...	...	...
...	2	...	...	...	3	3	2	6	...	...	...	...	...	...	...	...	2	1	...	3
...	3	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	2	...	...	...
...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	1	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	2	...	...	...	...	2	2	1	1	1	1	2	...	...	...	...	1	2	1	...
...	...	...	...	...	...	1	2	...	1	1	...	...	...	...	...	...	...	1	...	...
...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	1	3	...	1	4	3	2	...	3	1	...	...	...	...	1	1	3	...	1
...	1	...	1	...	...	2	...	...	...	2	...	...	...	...	...	...	2	...	...	...
...	10	...	7	...	4	8	12	5	1	6	...	...	...	1	...	...	7	4	3	7
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...
...	1	...	...	...	6	1	5	4	...	3	...	...	...	...	...	1	1	1	...	...
...	2	...	...	...	...	2	...	2	...	2	2	...	...	...	...	...	6	1	...	...
1	...	1	1	...	1	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...
...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	3	...
...	2	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...	1	2	3	...
...	...	...	1	...	...	...	...	1	...	1	...	...	...	...	1	1	...	...	...	...
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...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
...	1	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	1	...	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	1
...	2	3	3	1	5	6	10	3	1	5	5	2	...	...	...	...	3	1	2	5
...	2	...	...	...	1	...	...	...	...	4	...	...	...	...	...	2	1	...	...	...
...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	2	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	5	...	5	...	...	4	3	1	...	1	...	...	...	...	...	...	9	1	1	2
...	...	2	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...
...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	2	...	...	...	...	6	5	2	1	4	2	1	...	...	...	...	...	2	2	3
...	...	...	1	...	...	2	3	...	...	...	1	...	...	...	...	...	2	1	...	...
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
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...	2	...	1	...	...	4	5	...	2	6	4	...	...	1	...	...	6	1	5	6
...	...	...	1	...	...	...	2	...	...	...	...	...	...	...	...	...	2	5	...	...
1	4	...	4	2	10	12	6	4	1	9	3	1	...	...	1	5	3	6	1	...
...	9	...	3	...	...	7	5	2	2	1	4	...	...	...	...	1	...	2	2	1
...	1	...	...	...	...	...	...	1	2	1	...	...	...	...	...	...	...	...	...	...
...	...	...	1	...	3	7	4	3	1	...	1	...	...	1	...	...	...	...	1	3
...	...	...	...	1	...	3	1	2	...	1	...	...	...	...	...	...	...	...	...	...
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1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	1	...	1	...	3	2	...	...	1	...	...	...	...	...	...	1	1	...
...	2	...	...	...	1	...	3	...	...	3	...	...	...	...	...	...	...	...	...	...
...	2	2	1	...	1	4	4	2	...	1	1	1	...	...	...	...	1	3	1	...
...	...	1	1	1	...	1	...	3	...	...	2	...	...	...	...	...	...	...	...	...
1	5	1	3	...	...	5	6	6	1	1	...	1	...	...	...	...	1	2	1	3
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...
...	...	...	...	...	1	1	1	...	...	...	...	...	...	...	...	...	1	...	...	...
...	2	6	...	...	...	3	3	2	...	...	...	...	...	...	...	1	6	2	5	1
...	5	...	2	...	...	2	2	...	...	4	1	...	...	...	...	...	5	...	1	1
...	1	...	4	1	...	7	2	9	...	...	5	...	...	...	...	...	4	1	...	3
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	6	...	2	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Middlefield	700	8	11.43	...	...	...	...	...	...	...	...	...	...	...
Middleport	3,500	42	12.00	1	3	...	...	...	...	...	...	2	...	...
Midland City	4 0	5	12.50	...	...	...	...	...	...	...	...	...	...	...
Mifflin	250	2	8.00	...	...	...	...	...	...	...	...	...	...	...
Miller City	200	8	40.00	2	1	...	...	...	...	...	...	4	...	...
Mineral City	1,100	9	8.18	...	1	...	...	...	...	...	1	...	...	...
Mineral Ridge	1,200	17	14.17	1	1	2	...	...	...	...	...	...	...	...
Mogadore	600	8	13.33	...	...	1	...	...	...	...	...	...	...	...
Monroe	260	3	11.54	...	...	...	...	...	...	...	...	...	...	...
Montpelier	3,100	33	10.64	2	2	1	...	...	...	...	...	...	...	...
Morrow	950	10	10.53	1	1	...	...	...	...	...	...	...	...	...
Mt. Cory	312	1	3.21	...	...	...	...	...	...	...	...	...	...	...
Mt. Eaton	160	1	6.25	...	1	...	...	...	...	...	...	...	...	...
Mt. Gilead	2,200	17	7.73	...	...	...	...	...	...	...	...	...	1	...
Mt. Healthy	1,800	18	10.00	...	...	...	...	...	...	...	...	...	...	...
Mt. Orab	700	4	5.71	...	...	1	...	...	...	...	...	...	...	...
Murray City	1,200	10	8.33	...	1	2	...	...	...	1	...	...	...	...
Napoleon	5,000	48	9.60	1	1	5	...	...	...	...	...	2	1	...
Nashville	260	5	19.23	1	...	...	...	...	...	...	...	...	...	...
Navarre	1,275	13	10.20	...	...	...	1	...	2	1	...	...	...	...
Nevada	1,200	10	8.33	...	...	...	...	...	...	...	...	...	...	...
Neville	300	4	13.33	...	...	...	...	...	...	...	2	...	...	...
New Albany	250	6	24.00	...	...	...	...	...	...	...	...	...	...	...
New Bloomington	240	6	25.00	...	...	...	...	...	...	...	...	...	...	...
Newburgh Heights	500	1	2.00	...	...	...	...	...	...	...	...	...	...	...
New Carlisle	1,200	12	10.00	...	...	...	...	...	...	...	...	...	...	...
New Comerstown	3,500	28	8.00	1	...	1	...	...	...	...	...	...	...	...
New Knoxville	350	2	5.70	...	...	...	...	...	...	...	...	...	...	...
New Lebanon	190	2	10.52	...	...	...	...	...	...	...	...	...	...	...
New Matamoras	800	6	7.50	...	...	...	...	...	...	...	...	...	...	...
New Paris	1,200	14	11.67	1	...	...	...	...	...	...	...	...	1	...
New Richmond	2,000	29	14.50	2	3	2	...	...	4	...	...	...	...	...
New Riegel	300	5	16.67	...	...	...	...	...	...	...	...	...	...	...
New Salem	250	13	52.00	2	3	...	...	...	...	...	...	...	...	1
New Straitsville	3,000	27	9.00	...	...	...	...	...	...	...	2	...	1	...
Newtown	600	10	16.67	...	2	...	...	...	...	...	...	1	...	...
New Weston	328	3	9.15	...	...	...	...	...	...	...	...	1	...	...
Ney	450	3	6.67	...	...	...	...	...	...	...	...	...	...	...
North Amherst	2,000	21	10.50	3	...	...	...	...	...	...	...	...	...	...
North Robinson	250	1	4.00	...	...	...	...	...	...	...	...	...	...	...
Nottingham	1,500	16	10.67	2	2	...	...	...	...	...	...	...	...	...
Oakley	1,500	20	13.33	4	1	...	...	...	...	...	...	1	1	...
Oakwood	500	3	6.00	...	...	1	...	...	...	...	...	...	...	...
Oberlin	5,200	56	10.75	...	...	...	...	...	...	4	1	...	1	1
Ohio City	1,000	11	11.00	2	...	...	...	...	...	...	...	...	...	...
Olmsted Falls	314	3	9.55	...	...	...	...	...	...	...	...	...	...	...
Ottoville	700	1	1.43	...	...	...	...	...	...	...	...	...	...	...
Oxford	2,500	49	19.60	3	...	1	...	...	...	...	...	...	...	...
Palestine	300	2	6.67	...	1	...	...	...	...	...	...	...	...	...
Pandora	800	18	22.50	...	...	6	...	...	...	...	...	...	...	...
Payne	1,536	11	7.16	1	3	...	...	...	...	...	...	...	...	...
Peebles	1,000	5	5.00	...	...	...	...	...	...	...	...	...	...	...
Peninsula	575	3	5.22	...	...	...	...	...	...	...	...	...	...	...
Phillipsburg	360	5	13.89	...	...	...	...	...	...	...	...	...	...	...
Pickerington	300	6	20.00	...	1	...	...	...	...	...	...	...	...	...
Pioneer	900	6	6.67	...	...	...	...	...	...	...	...	...	...	...
Plain City	1,600	16	10.00	...	...	...	...	...	...	...	...	...	...	...
Plainfield	300	1	3.33	...	...	...	...	...	...	...	...	...	...	...
Pleasant City	1,200	2	1.67	...	1	1	...	...	...	1	...	...	...	...
Pleasant Hill	800	8	10.00	...	...	...	...	...	...	...	...	...	...	...
Pleasant Ridge	1,800	13	7.22	...	...	...	...	...	...	...	...	...	...	...
Port Clinton	3,000	55	18.33	2	...	2	...	...	...	...	...	...	...	...
Port Washington	500	8	16.00	1	...	1	...	...	...	...	...	...	...	...
Port William	500	7	14.00	...	...	...	...	...	...	...	...	...	1	...
Powhatan Point	500	3	6.00	...	...	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
			1			3	1	1		1	1									
	5		2			4	6	3			2							5	13	2
1										1		1				1		1		
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	1				1				1	1										
	1						4											1	1	
			1			2	2	7			1						1		1	
						1	2	1									2	1		
			1								2									
	1		1			5	6	5		5	1						2	1		
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	3					1	9	1		1	1									
1	3	1	1			2	4	1		1	3		1							2
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						1	1			1		1				3				2
	6	2	5			2	4	3	2	4	6	1					2		2	1
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	2					3	1			1	1						2			
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	2	2		2		1	3	3	1	4						1	3	1		4
			1					1		2	1									
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	2	1	2		1	4	4	2	1	1	1						3	1	1	
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	1		2			3	2	2		3	1						1	1		2
						2														
	4	1	3			6	14	4		3	6					1	5	2		
	1				1	4	1			1						1	1		1	
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	2	1	5	1		8	10	4		3	5						3	2	4	
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			2				6			2									1	
	2		1			1						1								
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	1		1			1											1		1	1
			1			3	1												1	
						1	1		1		2								1	
	1	1	3			1	2		1		3						3	1		
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	1					3		1			2								1	
	1					1	3			1	1					3		2		1
3	2	3	4			8	2	4	8	7	3					2	3	4		1
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	1					1	1	1	1								1			
						1											1	1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908. —Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Prairie Depot	900	10	11.11	1	...	...	...	...	...	...	...	...	...	...
Prospect	1,200	16	13.33	1	...	...	...	...	...	...	...	...	...	...
Racine	600	3	5.00	...	...	...	...	...	...	...	...	...	...	...
Rawson	600	5	8.33	...	2	...	...	...	...	...	...	...	...	...
Reading	4,500	30	6.67	2	2	...	...	...	...	...	...	...	1	...
Republic	550	8	14.55	1	1	...	...	...	...	...	...	...	...	...
Reynoldsburg	500	10	20.00	...	...	2	...	...	...	...	...	...	...	...
Richmond	400	3	7.50	...	...	...	...	...	...	...	...	...	...	...
Richwood	2,000	20	10.00	...	...	...	...	...	...	...	...	1	...	1
Ripley	2,500	30	12.00	3	...	...	...	...	...	...	...	...	...	1
Rising Sun	800	3	3.75	...	...	...	...	...	...	...	...	...	...	...
Rock Creek	600	9	15.00	...	...	...	...	...	...	...	...	...	1	1
Rockport	3,000	14	4.67	3	2	...	...	...	...	...	...	...	...	...
Rocky Ridge	450	4	8.89	...	...	...	...	...	...	...	...	...	...	...
Roscoe	800	1	1.25	...	...	...	...	...	...	...	...	1	...	...
Roseville	1,600	34	21.25	7	3	...	...	...	2	...	...	...	...	1
Rushville	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Sabina	2,000	22	11.00	1	1	1	...	...	...	...	...	...	1	...
St. Bernard	5,000	41	8.20	10	2	1	...	...	...	...	...	...	...	...
St. Henry	750	5	6.67	...	...	...	...	...	...	...	...	...	...	...
St. Paris	1,500	13	8.67	...	...	...	...	...	...	...	...	...	1	...
Salineville	3,000	28	9.33	...	...	2	...	...	...	...	...	...	...	...
Scio	1,300	9	6.92	...	2	1	...	...	...	...	...	...	...	...
Scott	550	6	10.91	1	...	...	...	...	...	...	...	...	...	1
Sebring	2,500	14	5.60	...	...	...	...	...	...	...	...	...	...	...
Seven Mile	400	1	2.50	...	...	...	...	...	...	...	...	...	...	...
Shanesville	500	1	2.00	1	...	...	...	...	...	...	1	...	...	...
Shawnee	4,000	39	9.75	8	6	...	...	...	...	...	...	1	...	...
Shelby	5,000	51	10.20	...	...	...	...	...	...	...	...	...	...	...
Sherodsville	900	23	25.55	...	...	...	...	...	...	...	...	...	...	...
Shiloh	650	11	16.92	3	...	...	...	...	...	...	...	...	...	...
Shreve	1,200	13	10.83	...	1	...	...	...	1	...	...	...	...	...
Sinking Spring	250	1	4.00	...	...	...	...	...	...	...	...	...	...	...
Smithville	500	7	14.00	...	...	...	...	...	...	...	...	...	...	...
Somerset	1,200	16	13.33	...	...	1	...	...	...	...	...	...	...	...
Somerville	400	8	20.00	...	...	...	...	...	...	...	...	...	...	...
South Charleston	1,200	12	10.00	3	...	...	...	...	...	...	...	...	...	1
South Point	500	2	4.00	...	2	...	...	...	...	...	...	1	...	...
South Salem	150	2	13.33	...	...	...	...	...	...	...	...	...	...	...
Spencerville	2,000	5	2.50	...	...	...	...	...	...	...	...	...	...	...
Springboro	450	5	11.11	1	...	...	...	...	...	...	...	...	...	...
Spring Valley	520	2	3.85	...	...	...	...	...	...	...	...	...	...	...
Stockport	400	4	10.00	...	...	...	...	...	...	...	...	...	...	...
Struthers	5,000	40	8.00	11	1	1	...	...	...	...	4	1	...	...
Stryker	1,450	16	11.03	...	...	...	...	...	...	...	...	...	...	...
Sugar Creek	300	5	16.67	1	...	...	...	...	...	...	...	...	...	...
Taylorsville	800	6	7.50	1	...	...	...	...	...	...	...	...	...	1
Thornville	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Tontogany	325	4	12.31	1	...	...	...	...	...	...	...	...	...	...
Toronto	5,000	50	10.00	9	8	1	...	...	4	5	...	...	...	...
Trenton	600	5	8.33	...	1	...	...	...	...	...	...	...	...	...
Trimble	700	9	12.86	...	2	1	...	...	...	...	1	...	...	...
Trotwood	300	3	10.00	...	...	...	...	...	...	...	...	...	...	...
Tuscarawas	500	4	8.00	1	...	...	...	...	...	...	...	...	...	...
Union City	1,500	11	7.33	2	...	1	...	...	...	...	...	...	...	...
Uniopolis	350	5	14.29	...	1	...	...	...	...	...	...	1	...	...
Upper Sandusky	4,000	37	9.25	3	2	...	...	...	...	...	...	...	...	...
Vandalia	300	4	13.33	...	...	...	...	...	...	...	...	...	...	...
Venedocia	300	4	13.33	...	...	...	...	...	...	...	...	...	...	...
Versailles	1,500	11	7.33	1	...	...	...	...	...	...	...	...	...	...
Vienna	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Vinton	500	6	12.00	...	1	...	...	...	1	...	...	...	...	...
Waldo	350	2	5.71	...	...	...	...	...	...	...	...	...	...	...
Wapakoneta	6,000	57	9.50	9	2	1	...	...	...	...	...	...	2	1
Washingtonville	1,000	21	21.00	2	...	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908. —Continued.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
...	1	1	...	...	...	1	2	...	1	...	...	...	...	1	...	...	1	...	2	...
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...	1	2	1	...	...	...	5	4	...	4	3	...	...	...	...	...	2	3	4	5
...	...	...	...	...	...	1	1	...	...	1	1	...	...	...	...	1	2	1	...	...
...	2	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	3	1	...	...
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1	2	...	...	1	1	...	3	3	1	...	1	...	1	...	...	...	2	...	2	...
...	6	1	2	...	...	4	6	5	...	1	1	...	...	...	...	...	1	2	...	2
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1	5	...	2	...	...	1	3	...	...	3	...	3	...	...	...	...	1	2	6	4
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...	5	1	2	...	...	6	3	7	1	7	2	...	...	...	...	...	1	5	...	2
...	...	...	...	...	...	...	...	3	2	...	...	...	...	...	...	...	2	...	...	...
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3	4	1	2	...	2	9	11	3	...	4	6	2	1	...	...	1	2	...	...	5
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...	2	1	...	...	2	3	1	...	...	2	1	...	...	...	...	...	2	1	1	2
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...	8	1	3	...	...	3	3	4	...	9	...	1	...	...	...	...	3	2	3	...
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...	6	2	2	1	1	8	5	2	4	8	2	2	...	...	...	...	2	4	4	3
...	...	...	...	1	...	1	1	3	2	2	1	1	1	...	...	1	4	2	1	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Concluded.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Wauseon	2,800	19	6.79	1	1	...	...	...	...	...	...	1	1	1
Waverly	1,900	16	8.42	1	2	2	...	...	...	...	2	...	2	...
Waynesburg	1,000	9	9.00	...	...	...	...	...	...	...	...	...	...	...
Waynesfield	750	6	8.00	1	...	...	...	...	...	...	...	...	...	...
Waynesville	800	16	20.00	...	2	...	...	...	...	...	...	...	...	...
Wellington	2,500	31	12.40	2	2	...	...	...	...	...	...	...	...	...
West Alexandria	1,200	9	7.50	...	...	...	...	...	...	...	...	...	...	...
West Cairo	400	2	5.00	...	...	...	...	...	...	...	...	...	...	...
Westerville	1,800	28	15.56	3	1	1	...	...	...	...	...	...	...	...
West Lafayette	1,020	5	4.90	...	...	...	...	...	...	...	...	...	...	...
West Liberty	1,500	19	12.67	...	1	...	...	...	...	...	...	...	1	...
West Milton	1,500	12	8.00	2	...	...	...	...	...	...	...	...	...	...
West Salem	600	6	10.00	...	...	...	...	...	...	...	...	...	...	...
West Union	1,200	10	8.33	...	3	...	...	...	...	...	...	...	...	...
West Unity	1,000	16	16.00	...	...	1	...	...	...	...	...	...	1	...
Wharton	600	7	11.67	...	...	...	...	...	...	...	...	...	...	1
Whitehouse	640	31	48.44	1	1	...	...	...	...	...	...	...	...	...
Wilkesville	300	3	10.00	...	1	...	...	...	...	...	1	...	...	...
Williamsburg	1,300	23	17.69	...	3	1	...	...	1	...	...	...	...	3
Williamsport	600	7	11.67	1	...	...	...	...	...	...	...	...	1	...
Wilmington	5,000	15	3.00	...	...	1	...	...	...	...	...	...	...	...
Windham	250	8	32.00	...	...	...	...	...	...	...	...	...	...	...
Woodsfield	3,100	36	11.61	4	...	1	...	...	...	...	...	...	...	...
Wyoming	2,000	22	11.00	3	1	1	...	...	...	...	...	...	...	...
Zoar	200	3	15.00	...	...	...	...	...	...	...	...	...	...	...
Totals	493,637	5,165	10.46	349	200	112	5	...	24	19	25	46	61	37

*By Health Officer.

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Concluded.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	**Still Births.**
...	...	2	...	...	...	3	2	...	...	...	1	...	...	...	...	...	...	1	7	...
...	3	1	...	...	...	...	1	...	...	1	...	...	...	...	...	...	3	1	...	...
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1	...	...	...	...	...	3	...	...	...	1	...	1	...	...	...	...	...	...	...	...
...	4	...	...	...	...	3	5	...	...	3	1	...	...	...	...	...	...	...	...	...
...	...	...	3	...	...	7	4	4	1	4	1	2	...	...	...	...	...	2	1	...
...	...	...	...	...	...	2	...	...	...	...	1	...	...	...	...	...	2	2	2	...
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...
...	1	...	5	...	...	3	1	1	4	1	1	1	1	...	...	2	3	2	1	...
...	1	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	...	2
1	3	...	...	...	...	2	3	4	...	1	1	...	...	...	...	...	2	...	1	3
...	...	...	3	...	2	2	1	...	...	2	...	...	...	...	...	...	...	...	2	...
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...	3	...	2	...	...	7	1	2	2	1	2	1	...	...	...	2	8	2	2	1
...	3	2	1	...	...	4	4	1	1	...	4	...	...	...	...	1	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...
48	449	92	250	44	145	594	639	364	110	432	301	63	14	22	14	112	416	427	214	229

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Adams—														
Franklin	1,572	21	13.36	...	...	1	...	...	...	...	...	1	...	...
Meigs	2,350	13	5.53	...	2	...	...	...	...	...	...	...	...	1
Oliver	976	12	12.30	1	...	1	...	...	...	...	...	...	...	...
Wayne	1,204	16	13.29	...	1	...	...	...	...	...	1	...	...	...
Winchester	936	17	18.16	1	1	2	...	...	...	...	...	...	1	1
Allen—														
Amanda	1,384	5	3.61	...	...	...	...	...	...	1	...	...	...	...
Bath	1,517	3	1.98	...	...	...	...	...	...	...	...	...	...	...
German	1,511	5	3.31	1	1	...	...	2	...	...	...	...	...	...
Richland	1,839	9	4.89	...	...	...	...	...	...	...	...	...	...	...
Shawnee	1,493	13	8.70	2	...	2	...	...	...	...	...	...	...	...
Spencer	1,142	4	3.50	...	...	...	...	...	...	...	...	...	...	...
Ashland—														
Green	1,206	9	7.46	...	...	1	...	...	...	...	...	...	1	...
Jackson	923	11	11.92	3	8	...	...	...	1	...	...	...	...	...
Lake	684	4	5.85	...	...	...	...	...	...	...	...	...	...	...
Milton	869	6	6.90	...	...	...	...	...	...	...	...	...	...	...
Orange	1,201	9	7.49	...	...	...	...	...	...	...	...	...	...	...
Sullivan	808	7	8.66	...	...	...	...	...	...	...	...	...	1	...
Vermilion	1,230	8	6.50	...	...	1	...	...	...	...	...	...	...	...
Ashtabula—														
Andover	719	10	13.91	1	...	...	...	...	...	...	...	...	...	...
Ashtabula	1,038	15	14.45	1	1	...	...	...	...	...	...	1	...	...
Austinburg	1,040	9	8.65	...	...	1	...	...	...	...	...	...	...	...
Conneaut	2,392	7	2.93	2	...	...	...	...	...	...	...	...	...	...
Denmark	703	10	14.22	...	...	...	...	...	...	...	...	...	...	...
Geneva	1,254	15	11.96	...	...	1	...	...	...	...	...	...	...	...
Harpersfield	893	8	8.96	...	...	1	...	...	...	...	...	...	...	...
Kingsville	1,412	14	9.91	...	...	...	...	...	...	...	...	...	...	...
Lenox	742	6	8.09	...	...	...	...	...	...	...	...	...	...	...
Morgan	562	8	14.23	3	1	...	...	...	...	...	1	...	...	...
New Lyme	837	9	10.75	1	1	...	...	...	...	...	...	...	...	...
Orwell	981	11	11.21	...	...	1	...	...	...	...	...	...	...	...
Richmond	848	3	3.54	...	...	...	...	...	...	...	...	...	...	...
Wayne	685	8	11.68	...	...	1	...	...	...	...	...	...	...	...
Athens—														
Carthage	1,136	3	2.64	...	2	...	...	...	...	...	...	...	...	...
Dover	1,488	16	10.75	4	2	...	...	...	...	...	1	1	...	...
Rome	1,767	5	2.83	...	...	1	...	...	...	...	...	1	...	...
Troy	1,426	21	14.73	...	1	2	...	...	...	...	...	...	...	...
York	3,762	34	9.04	10	6	2	...	...	...	...	...	...	...	...
Auglaize—														
German	893	9	10.08	...	2	2	...	...	...	...	1	...	...	...
Goshen	908	1	1.10	...	1	...	...	...	...	1	...	...	...	...
Jackson	731	8	10.94	1	...	...	...	...	...	...	...	...	...	...
Noble	1,360	6	4.41	1	1	...	...	...	...	...	...	...	...	...
Pusheta	1,275	10	7.84	...	...	...	...	...	...	...	...	...	...	...
Salem	959	5	5.21	1	...	...	...	...	...	...	...	...	...	...
Union	1,666	11	6.60	1	1	...	...	...	...	...	...	...	...	...
Belmont—														
Colerain	2,987	2	.67	...	1	...	...	...	...	...	...	1	...	...
Kirkwood	1,662	5	3.01	...	...	...	...	...	...	...	...	...	...	1
Mead	1,726	19	11.01	...	...	...	...	...	...	...	...	1	...	...
Pultney	3,477	1	.29	...	1	...	...	...	...	...	...	1	...	...
Smith	1,710	1	.58	...	1	...	...	...	...	1	...	...	...	...
Warren	2,160	2	.93	...	2	...	...	...	...	1	...	1	...	...
Washington	1,540	9	5.84	...	2	...	...	...	...	...	...	1	...	...
Wayne	1,415	2	1.41	...	1	...	...	...	...	...	...	...	...	...
Wheeling	1,222	7	5.81	...	...	1	...	...	...	2	...	...	...	...
Brown—														
Franklin	959	4	4.17	...	...	1	...	...	...	...	...	1	...	...
Huntington	1,861	10	5.37	...	...	...	...	...	...	...	...	...	...	...
Jackson	924	3	3.25	...	...	...	...	...	...	...	...	2	...	...
Jefferson	618	9	14.56	1	...	...	...	...	...	...	1	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Il-defined Diseases.	Still Births.
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......	2	...	...	...	...	2	3	2	...	...	...	...	...	...	...	...	1	1		...
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......	1	...	1	...	...	4	2	2	...	...	...	...	...	...	...	2	...	...	2	...
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......	1	...	2	...	...	...	4	1	...	...	...	...	...	...	...	...	4	1	1	...
......	...	...	1	...	...	1	1	...	...	...	1	...	...	...	...	...	...	...	3	...
......	...	1	1	1	...	...	5	...	...	1	...	...	...	...	...	...	2	...	3	...
......	1	...	...	1	1	1	...	2	...	...	...	...	...	...	...	...	...	...		...
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Butler—														
Lemon	1,825	10	5.48	...	...	...	...	...	...	...	...	...	...	...
Oxford	1,562	25	16.00	3	1	1	...	...	...	...	1	...	2	...
Reiley	1,113	13	11.68	3	...	...	...	...	...	...	...	...	...	...
St. Clair	1,388	25	10.80	5	5	...	...	...	1	1	...	...	...	...
Union	1,743	11	6.31	...	...	...	...	...	...	...	...	...	...	...
Wayne	1,010	1	.99	...	...	...	...	...	...	1	...	...	...	...
Carroll—														
East	606	7	11.55	1	...	...	...	...	...	...	...	...	...	...
Fox	1,149	7	6.09	...	...	1	...	...	...	...	...	...	...	...
Lee	849	10	11.78	2	...	...	...	...	...	...	...	...	...	...
Rose	1,371	2	1.46	...	...	...	...	...	...	...	...	...	...	...
Champaign—														
Harrison	744	6	8.06	...	...	...	...	...	...	...	...	1	...	...
Jackson	1,760	8	4.55	...	...	...	...	...	...	...	...	...	...	...
Johnson	1,334	14	10.49	...	...	...	...	...	...	...	...	...	...	1
Union	1,074	2	1.86	...	...	...	...	...	...	...	...	...	...	...
Clark—														
Bethel	2,100	1	.48	...	1	...	...	...	...	...	...	1	...	...
Harmony	1,830	13	7.10	...	...	...	...	...	...	...	...	...	...	...
Madison	1,185	3	2.53	...	...	1	...	...	...	...	...	...	...	...
Mad River	1,552	4	2.58	1	...	...	...	...	...	...	...	...	...	...
Springfield	3,608	7	1.94	5	...	...	...	...	...	...	...	...	...	...
Clermont—														
Goshen	1,456	8	5.49	...	...	...	...	...	...	...	...	...	...	...
Jackson	1,292	5	3.87	...	...	...	...	...	...	...	...	...	1	...
Pierce	1,644	11	6.69	...	...	1	...	...	...	...	...	...	...	...
Tate	2,016	6	2.98	...	...	...	...	...	...	...	...	...	...	...
Washington	1,541	4	2.60	...	1	...	...	...	1	...	...	...	...	...
Wayne	1,537	15	9.76	...	...	...	...	...	2	...	...	...	...	...
Clinton—														
Adams	754	2	2.64	...	...	...	...	...	...	...	...	...	...	...
Jefferson	1,040	10	9.62	3	...	...	...	...	...	...	...	...	1	...
Marion	860	4	4.65	...	...	...	...	...	...	...	...	...	...	...
Richland	1,289	5	3.88	...	...	...	...	...	...	...	...	...	...	...
Wayne	1,149	10	8.69	...	1	1	...	...	4	...	...	...	...	...
Columbiana—														
Butler	1,523	11	7.22	...	1	...	...	...	...	...	...	...	...	...
Hanover	1,455	4	2.75	...	...	...	...	...	...	...	...	...	...	...
Terry	1,124	11	9.79	2	1	...	...	...	...	...	...	...	...	...
Salem	1,637	5	3.05	...	2	...	...	...	...	1	...	...	...	...
Coshocton—														
Adams	968	7	7.23	2	...	1	...	...	...	...	1	...	...	2
Bethlehem	730	3	4.11	...	...	...	...	...	...	...	...	...	...	...
Franklin	1,137	12	10.55	4	2	...	...	...	...	...	...	...	...	...
Lafayette	1,393	11	7.90	1	1	3	...	...	...	...	...	...	1	...
Linton	1,215	13	10.70	...	...	4	...	...	...	...	...	...	...	...
Monroe	909	6	6.60	...	...	...	...	...	...	...	...	...	...	...
New Castle	924	4	4.33	...	...	...	...	...	...	...	...	...	...	...
Tiverton	876	13	14.84	...	...	1	...	...	...	1	...	...	...	...
Tuscarawas	1,866	10	5.36	...	...	3	...	...	...	...	...	1	...	...
Washington	748	5	6.68	...	...	1	...	...	...	...	...	...	...	...
Crawford—														
Dallas	465	2	4.30	...	...	...	...	...	1	...	...	...	...	...
Holmes	1,500	13	8.67	1	...	1	...	...	...	...	...	...	...	...
Jefferson	697	9	12.91	...	...	1	...	...	...	...	...	...	...	...
Liberty	1,566	12	7.66	2	...	...	...	...	...	...	...	...	...	...
Sandusky	569	2	3.51	...	...	...	...	...	...	...	...	...	...	...
Tod	882	5	5.67	...	1	...	...	...	...	...	...	...	...	...
Cuyahoga—														
Bedford	1,140	24	21.05	...	2	...	1	...	...	...	...	...	...	...
Euclid	2,634	21	7.97	5	...	...	...	...	...	...	...	...	...	...
Mayfield	849	6	7.07	...	1	...	...	...	...	...	...	...	...	...
Royalton	1,128	12	10.64	...	1	...	...	...	...	...	...	...	...	...
Strongsville	1,178	7	5.94	...	...	...	1	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
...	...	...	1	...	...	3	1	1	...	1	3	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	5	1	4	...	3	2	...	...	...	...	1	5	...	...	...
...	...	2	...	...	1	1	1	4	2	1	1	...	...	...	...	...	...	...	...	...
...	7	1	1	...	2	1	...	6	...	3	1	...	...	...	...	...	1	...	...	1
...	1	...	...	...	...	1	1	1	...	3	2	1	...	...	...	1	...	...	...	1
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1	3	...	1	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...
...	4	...	1	...	...	...	...	...	...	...	1	...	...	1	...	...	5	1	...	...
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...	...	...	1	...	...	1	...	2	1	...	2	...	...	...	...	...	1	...	...	...
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...	3	...	...	...	...	...	...	...	...	...	1	1	...	...	1	...	...	...	...	1
1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
3	2	...	...	...	...	2	1	4	...	...	...	...	1	...	...	...	...	...	...	...
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...	1	1	...	...	...	...	1	3	...	1	...	...	...	...	...	...	1	...	1	3
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...	3	...	2	1	...	4	2	6	...	1	...	...	...	...	...	...	1	2	1	...
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...	...	...	...	...	...	1	1	2	...	...	...	1	...	...	...	...	...	1	...	2
...	...	...	1	...	...	1	2	2	1	2	...	...	...	...	1	...	1	1	...	...
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Darke—														
Adams	1,954	18	9.21	...	...	...	...	...	...	...	1	...	...	...
Butler	1,659	2	1.21	...	...	...	...	...	...	...	...	...	...	...
Franklin	1,635	7	4.28	...	...	...	...	...	...	...	...	1	...	...
German	1,376	7	5.09	1	...	1	...	...	...	...	...	...	...	...
Greenville	2,940	44	14.97	1	1	...	...	...	...	...	1	2	1	...
Jackson	1,516	4	2.64	...	...	...	...	...	...	...	...	...	...	...
Monroe	1,352	14	10.35	...	...	1	...	...	...	...	...	...	...	...
Richland	1,217	9	7.40	...	...	1	...	...	...	...	...	...	...	...
Twin	1,448	8	5.52	...	...	1	...	...	...	...	...	...	...	1
Washington	1,343	9	6.70	...	1	...	...	...	...	...	...	...	...	...
Wayne	1,371	19	13.86	...	...	...	...	...	...	...	...	...	...	...
York	942	1	1.06	...	...	...	...	...	...	...	...	...	...	...
Defiance—														
Highland	1,511	8	5.29	1	...	...	1	...	...	1	...	...	...	...
Mark	1,685	3	1.78	...	1	...	...	...	...	...	...	...	...	...
Richland	1,444	4	2.77	...	...	...	...	...	...	...	...	...	...	...
Tiffin	1,514	7	4.62	...	...	...	...	...	...	...	...	...	...	...
Washington	1,265	14	11.07	...	...	...	...	...	...	...	...	...	...	...
Delaware—														
Harlem	1,005	6	5.97	...	...	1	...	...	...	...	...	...	...	...
Kingston	629	4	6.36	...	...	...	...	...	...	...	...	...	...	...
Orange	976	11	11.27	...	1	1	...	...	...	...	...	1	...	...
Porter	738	3	4.07	...	...	...	...	...	...	...	...	...	...	...
Scioto	1,194	9	7.54	1	2	...	...	...	...	...	...	...	...	1
Thompson	709	4	5.64	...	...	...	...	...	2	...	...	...	...	...
Erie—														
Florence	1,096	1	.91	...	...	...	...	...	...	...	...	...	...	...
Margaretta	2,751	7	2.54	...	...	1	...	...	...	...	...	...	...	...
Oxford	950	5	5.26	...	...	...	...	...	...	...	...	...	...	...
Fairfield—														
Berne	2,031	4	1.97	...	...	...	...	...	...	...	...	...	...	...
Bloom	1,500	16	10.67	...	...	...	...	...	...	...	...	...	...	...
Clear Creek	1,810	23	12.71	2	1	1	...	...	...	...	...	...	...	...
Greenfield	1,563	7	4.48	...	...	...	...	...	...	...	...	...	...	...
Madison	1,127	5	4.44	...	...	...	...	...	...	...	...	...	...	...
Richland	956	7	7.32	2	1	...	...	...	...	...	...	...	1	1
Violet	1,417	1	.71	1	...	...	...	...	...	...	...	1	...	...
Fayette—														
Concord	733	2	2.73	...	...	...	...	...	...	...	...	...	...	...
Jefferson	2,239	1	.45	...	...	1	...	...	...	...	...	...	...	...
Paint	1,655	2	1.21	...	...	2	...	...	...	...	...	...	...	...
Franklin—														
Brown	800	4	5.00	...	...	...	...	...	...	...	...	...	...	...
Hamilton	1,474	1	.68	...	...	...	...	...	...	...	...	1	...	...
Perry	1,676	6	3.58	...	...	1	...	...	...	1	...	1	...	...
Plain	939	4	4.26	...	...	...	...	...	...	...	...	...	...	...
Sharon	1,356	7	5.16	...	...	...	...	...	...	...	...	...	...	...
Washington	964	4	4.15	...	...	1	...	...	...	...	...	...	...	...
Fulton—														
Franklin	1,138	4	3.51	...	...	...	...	...	...	...	...	...	...	...
Royalton	1,198	6	5.01	...	...	...	...	...	...	...	...	...	...	...
Gallia—														
Cheshire	1,851	17	9.18	1	3	1	...	...	...	...	...	...	...	...
Green	1,257	8	6.36	...	2	...	...	...	...	...	2	...	...	...
Morgan	1,232	10	8.12	...	...	...	...	...	...	...	...	...	...	...
Springfield	1,844	15	8.13	...	...	...	...	...	...	...	...	...	1	...
Geauga—														
Bainbridge	758	3	3.96	...	...	...	...	...	...	...	...	...	...	...
Chester	716	5	6.98	...	...	...	...	...	...	...	...	...	...	...
Claridon	764	20	26.18	...	...	...	...	...	...	...	...	...	2	...
Hampden	603	7	11.61	3	...	...	...	...	...	...	...	...	1	...
Huntsburg	809	5	6.18	...	...	...	...	...	...	...	...	...	1	...
Munson	780	5	6.41	...	...	...	...	...	...	...	...	...	...	...
Parkman	849	9	10.60	...	...	1	...	...	...	...	...	...	1	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
	1		1	2	1	2		2		4		2						2		
								1			1									
	2		1			1		1											1	
	2					1	1	1						1						2
2	14	1	2				6	8	1	2						1	2	1		1
			1					1			1						1			
						1	4	4		3	1									3
	1	2	1			1		1			1								1	1
			1		1					1									1	1
	1					4		1		1	1									1
	4				1	3	2	1	2	1						1	1	1	1	1
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	1					2	2										1			
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	2	3	1		2	2	3	1	1	3	1						1	1	1	
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	2					5	3	2	1	1							1		1	
		1					1										2	1	1	
	1				3		2									1			3	
	4					1	3	2	1			1					1	1		
							1			1									1	
		1						1			1								2	
	1						7	3	1	1				1			3		1	
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						1		2	1											
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	2		1			2	1										1			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Geauga—Concluded														
Russell	695	7	10.07	...	...	...	...	...	...	...	...	...	...	...
Troy	897	11	12.26	...	...	1	...	...	...	...	...	...	...	1
Greene—														
Beaver Creek	2,070	8	3.86	2	3	...	...	...	...	...	...	...	...	...
Cedarville	1,278	3	2.35	...	...	1	...	...	...	...	...	...	...	...
Jefferson	1,158	9	7.77	...	...	1	...	...	...	...	...	...	1	...
Ross	1,141	1	.87	...	...	...	...	...	...	...	...	...	...	...
Silver Creek	1,109	11	9.92	...	...	...	...	...	...	...	...	...	2	...
Spring Valley	938	5	5.33	...	...	...	...	...	...	...	...	...	...	...
Guernsey—														
Adams	717	2	2.79	...	...	...	...	...	...	...	...	...	...	...
Cambridge	1,650	14	8.48	...	...	...	...	...	...	...	...	...	...	...
Jackson	1,898	1	.53	...	...	...	...	...	...	...	...	...	...	...
Knox	845	1	1.18	...	...	1	...	...	...	...	...	...	...	...
Londonderry	1,141	1	.88	...	...	...	...	...	...	1	...	...	...	...
Madison	883	6	6.80	...	...	...	...	...	...	...	...	...	...	...
Hamilton—														
Colerain	3,410	37	10.85	2	3	2	...	...	...	...	...	1	3	...
Columbia	2,398	24	10.01	4	1	...	2	...	...	...	...	...	...	1
Crosby	883	4	4.53	...	...	...	...	...	...	...	...	...	1	...
Green	4,532	34	7.50	2	2	...	...	...	...	1	1	...	...	...
Harrison	636	5	7.86	1	...	...	...	...	...	...	...	...	...	...
Millcreek	5,304	33	6.22	...	...	...	...	...	...	...	...	...	...	...
Spencer	257	4	15.56	...	...	...	...	...	...	...	...	...	...	...
Springfield	3,929	23	5.85	8	...	...	...	...	...	...	...	...	...	...
Whitewater	1,291	11	8.52	...	...	...	...	...	...	3	...	...	...	...
Hancock—														
Allen	987	3	3.04	1	...	...	...	...	...	...	...	...	...	...
Amanda	854	6	7.03	...	...	...	...	...	...	...	...	...	...	...
Big Lick	1,156	6	5.19	1	...	...	...	...	...	...	...	...	...	...
Cass	677	3	4.43	...	...	...	...	...	...	...	...	...	...	...
Liberty	1,486	6	4.04	...	...	...	...	...	...	...	...	...	...	...
Madison	1,009	10	9.91	...	...	...	...	...	...	...	...	...	1	...
Pleasant	1,503	13	8.65	4	2	...	...	...	...	...	...	...	...	1
Van Buren	789	11	13.94	...	1	1	...	...	...	...	...	...	...	...
Hardin—														
Liberty	1,410	9	6.38	3	1	...	...	...	...	...	...	...	...	...
Harrison—														
Archer	700	4	5.71	...	...	...	...	...	...	...	...	...	...	...
Franklin	677	9	13.30	...	...	...	...	...	...	...	...	...	...	...
German	1,203	10	8.31	...	...	...	...	...	...	...	...	...	...	...
Monroe	955	13	13.61	...	1	1	...	...	...	...	1	...	1	...
Rumley	843	19	22.54	...	2	...	...	...	3	...	...	...	2	...
Washington	1,247	9	7.22	...	2	...	...	...	...	...	...	...	...	...
Henry—														
Bartlow	1,430	1	.70	...	...	...	...	...	...	...	...	...	...	...
Flatrock	1,359	12	8.83	...	...	...	...	...	...	...	...	...	...	...
Harrison	1,232	8	6.49	1	...	...	...	...	...	...	1	...	...	...
Pleasant	1,776	8	4.50	...	...	...	...	...	...	...	...	...	1	...
Ridgeville	1,241	11	8.86	2	...	2	...	...	...	...	...	...	...	...
Washington	1,188	16	13.47	1	...	1	...	...	...	...	...	...	...	1
Highland—														
Hamer	918	8	8.71	...	...	1	...	...	...	...	...	...	...	...
Jackson	912	8	8.77	...	1	...	...	...	...	...	...	...	...	...
Marshall	740	5	6.76	...	...	...	...	...	...	...	...	...	...	...
Hocking—														
Good Hope	1,227	2	1.63	...	...	...	...	...	...	...	...	...	...	...
Salt Creek	1,509	10	6.62	...	2	...	...	...	...	...	...	...	...	...
Holmes—														
Knox	814	1	1.23	...	...	...	...	...	...	...	...	...	...	...
Prairie	937	10	10.67	...	...	1	...	...	...	...	...	...	...	...
Richland	1,023	14	13.68	...	...	2	...	...	...	...	...	...	...	...
Salt Creek	1,355	7	5.17	2	1	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Holmes—Concluded.														
Walnut Creek	1,609	9	5.59	...	...	...	...	...	...	...	...	...	...	...
Washington	1,019	5	4.91	...	1	1	...	...	...	...	...	...	...	...
Huron—														
Bronson	824	5	6.19	...	...	...	...	...	...	...	...	...	...	...
Clarksfield	1,051	7	6.66	...	...	...	...	...	...	...	...	...	1	...
Fitchville	475	6	12.63	1	...	...	1	...	...	...	...	...	...	...
Greenfield	706	1	1.41	...	...	...	...	...	...	...	...	...	...	...
Greenwich	612	3	4.90	...	...	...	...	...	...	...	...	...	...	...
Norwich	824	2	2.43	...	...	...	...	...	...	...	...	...	...	...
Peru	897	1	1.11	...	...	...	...	...	...	...	...	1	...	...
Richmond	787	1	1.27	...	...	1	...	...	...	...	...	...	...	...
Townsend	977	6	6.14	...	...	...	...	...	...	...	...	...	1	...
Jackson—														
Bloomfield	1,006	10	9.94	1	2	1	...	...	...	...	2	3	...	...
Lick	1,326	26	19.60	4	3	1	...	...	...	...	...	...	2	...
Milton	2,304	2	.87	...	2	...	...	...	...	...	...	2	...	...
Washington	1,151	7	6.08	...	1	2	...	...	...	...	...	1	...	...
Jefferson—														
Salem	1,086	2	1.84	...	...	...	...	...	...	...	...	...	...	...
Smithfield	1,434	7	4.88	...	4	...	...	...	...	2	1	2	...	...
Springfield	1,078	8	7.42	...	...	...	1	...	...	...	...	3	...	...
Steubenville	900	6	6.67	...	...	...	...	...	...	...	...	...	...	...
Warren	2,053	6	2.92	...	...	1	...	...	...	...	...	...	...	1
Knox—														
Berlin	694	6	8.65	...	...	...	...	...	...	...	...	...	...	...
Brown	1,042	7	6.72	...	...	...	...	...	...	...	...	...	...	...
Butler	694	3	4.32	...	...	...	...	...	...	...	...	...	...	...
College	232	4	17.24	...	...	...	...	...	...	...	...	...	...	...
Jackson	798	4	5.01	...	...	...	...	...	...	...	...	...	...	...
Milford	762	2	2.62	...	...	...	...	...	...	...	...	...	...	...
Monroe	807	4	4.95	...	...	...	...	...	...	...	...	...	...	...
Morgan	650	7	10.77	...	...	...	...	...	...	...	...	...	...	...
Pleasant	818	9	11.00	...	...	...	...	...	...	...	...	...	...	...
Lake—														
Kirtland	1,134	4	3.53	...	...	...	...	...	...	...	...	...	...	...
Le Roy	678	4	5.90	...	...	...	...	...	...	...	...	...	...	...
Painesville	1,853	10	5.40	1	...	...	...	...	...	...	...	...	...	...
Perry	1,687	5	2.96	...	...	...	...	...	...	...	...	...	...	...
Lawrence—														
Decatur	1,063	3	2.82	...	...	...	...	...	...	...	...	...	...	...
Hamilton	659	3	4.55	...	...	1	...	...	...	...	...	...	...	...
Rome	2,776	4	1.44	...	...	1	...	...	...	...	...	...	...	...
Union	2,564	9	3.51	...	...	3	...	...	...	...	...	1	...	...
Windsor	2,239	9	4.02	...	...	5	...	...	...	...	...	...	...	...
Licking—														
Bowling Green	808	2	2.48	...	...	...	...	...	...	...	...	...	...	...
Burlington	922	6	6.51	...	...	...	...	...	...	...	...	...	...	...
Eden	620	3	4.84	...	...	...	...	...	...	...	...	...	...	...
Etna	955	8	8.38	...	...	...	...	...	...	...	...	...	...	...
Fallsbury	836	8	9.57	2	...	...	...	...	...	...	1	...	...	...
Hanover	983	7	7.12	...	1	...	...	...	...	...	...	1	...	...
Jersey	1,081	4	3.70	...	...	...	...	...	...	...	...	...	...	1
Licking	994	1	1.01	...	1	1	...	...	...	...	...	...	...	...
McKean	824	8	9.71	2	...	...	...	...	...	...	...	...	...	...
Perry	807	4	4.96	...	1	...	...	...	...	...	...	...	...	...
Logan—														
McArthur	940	11	11.70	1	...	...	...	...	...	...	...	...	...	...
Perry	1,047	9	8.60	2	...	...	...	...	...	...	...	...	...	...
Pleasant	978	9	9.20	...	...	...	...	...	...	...	...	...	...	...
Richland	1,191	10	8.40	...	...	...	...	...	...	...	...	...	...	...
Lorain—														
Brighton	490	4	8.16	...	...	...	...	...	...	...	...	...	...	...
Brownhelm	1,100	5	4.55	...	...	...	...	...	...	...	...	...	...	...
Columbia	1,090	11	10.09	1	1	...	...	...	...	...	...	...	...	...

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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
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Lorain—Concluded.														
Eaton	958	9	9.39	...	...	...	...	...	...	...	...	...	...	...
Elyria	910	2	2.20	...	...	...	...	...	...	...	...	...	...	...
Grafton	848	5	5.90	...	...	...	...	...	...	...	...	...	...	...
Pittsfield	782	3	3.84	...	...	...	...	...	...	...	...	...	...	...
Rochester	402	3	7.46	...	...	...	...	...	...	...	...	...	...	...
Russia	981	2	2.04	...	...	...	...	...	...	...	...	...	...	...
Lucas—														
Jerusalem	1,581	13	8.22	6	2	...	...	...	...	...	...	...	...	...
Monclova	1,031	7	6.79	...	...	...	...	...	...	...	...	...	...	...
Oregon	2,702	21	7.77	5	2	...	...	...	...	...	...	1	1	...
Providence	1,270	15	11.81	3	...	...	...	...	...	...	...	...	...	...
Richfield	1,136	9	7.92	2	1	1	...	...	...	...	1	...	...	...
Sylvania	1,270	17	13.39	3	...	...	...	...	...	...	...	...	...	...
Madison—														
Deer Creek	882	8	9.07	...	1	...	...	...	...	...	...	...	...	...
Fairfield	1,481	14	9.45	1	1	...	...	...	...	1	...	1	2	1
Jefferson	1,236	9	7.28	...	...	...	...	...	...	...	...	...	...	...
Oak Run	560	1	1.80	...	...	...	...	...	...	...	...	...	...	...
Mahoning—														
Coitsville	1,815	28	15.43	...	...	1	...	...	...	...	...	...	...	...
Ellsworth	663	3	4.52	...	...	...	...	...	...	...	...	...	...	...
Goshen	1,406	12	8.53	1	...	...	...	...	...	...	...	...	...	...
Milton	657	6	9.13	...	...	1	...	...	...	...	...	...	...	...
Smith	2,136	19	8.90	...	...	...	...	...	...	...	...	2	...	...
Springfield	2,137	25	11.70	...	...	...	...	...	...	...	...	...	...	...
Marion —														
Grand	499	1	2.00	...	...	...	...	...	...	...	...	...	...	...
Montgomery	926	10	10.80	1	...	...	...	...	...	...	...	...	...	...
Pleasant	1,109	15	13.52	...	...	...	...	...	...	...	...	...	...	...
Salt Rock	619	1	1.62	...	...	...	...	...	...	...	...	...	...	...
Tully	877	8	9.12	1	...	...	...	...	...	...	...	...	1	...
Waldo	644	3	4.66	...	...	...	...	...	...	...	...	...	...	...
Medina—														
Chatham	904	3	3.32	1	...	...	...	...	...	...	...	...	...	...
Hinckley	840	5	5.95	...	...	...	...	...	...	...	...	...	...	...
Medina	671	8	11.92	1	...	...	...	...	...	...	...	...	1	...
Spencer	963	8	8.31	...	...	...	...	...	...	...	...	...	...	...
Meigs —														
Chester	1,597	9	5.64	...	...	...	...	...	...	...	4	...	...	...
Columbia	1,016	10	9.84	...	...	...	...	...	...	...	...	...	...	...
Mercer —														
Butler	1,368	6	4.39	...	1	...	...	...	...	...	...	...	...	1
Franklin	1,003	4	3.99	...	1	...	...	...	...	...	...	...	...	...
Liberty	1,733	7	4.04	...	...	...	...	...	...	...	...	...	...	...
Miami—														
Brown	1,256	9	7.17	...	...	...	...	...	...	...	...	...	...	...
Concord	1,306	10	7.66	1	1	...	...	...	...	...	...	1	...	...
Elizabeth	1,124	1	.80	1	...	...	...	...	...	...	...	...	...	...
Monroe	1,228	5	4.07	...	...	...	...	...	...	...	...	...	...	...
Newbury	2,316	13	5.61	...	1	...	...	...	...	...	...	...	...	...
Newton	1,980	7	3.54	2	...	...	...	...	...	...	1	...	...	...
Washington	997	9	9.03	1	...	...	...	...	...	...	...	...	...	...
Monroe—														
Adams	1,149	6	5.22	...	...	...	...	...	...	...	...	...	...	...
Benton	1,026	11	10.72	...	...	2	...	...	...	...	...	1	...	1
Center	2 027	1	.49	...	1	...	...	...	...	...	...	1	...	...
Ohio	1,750	7	4.00	...	2	4	...	...	...	3	...	...	...	...
Montgomery—														
German	1,658	24	14.47	2	1	...	...	...	...	...	...	...	...	...
Mad River	2,310	5	2.16	...	...	...	...	...	...	...	...	...	1	...
Randolph	2,075	2	.96	...	...	...	...	...	...	...	...	...	...	...
Morgan—														
Center	953	9	9.44	...	...	...	...	...	...	...	...	...	2	...
Deerfield	839	3	3.58	...	...	...	...	...	...	...	...	...	...	...

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...	2	...	...	...	...	4	2	4	1	3	...	...	...	...	1	...	2	...	...	2
...	...	...	...	...	...	4	5	...	...	...	2	1	...	...	...	...	1	...	2	...
...	2	...	...	...	...	2	...	...	...	1	...	...	...	...	...	...	1	...	1	...
...	3	...	1	...	...	3	1	1	1	...	2	...	...	...	...	...	1	4	...	1
...	...	...	1	1	...	...	...	...	...	1	1	...	...	...	...	...	4	...	...	...
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1	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
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...	...	...	...	...	...	4	4	...	...	...	...	...	...	...	...	1	4	1	1	...
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...	1	1	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	2	...	...
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1	1	1	2	...	...	1	7	3	1	1	1	...	...	...	...	2	1	1	1	2
...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Morgan—Concluded.														
Manchester	585	12	20.51	2	...	...	...	...	...	...	...	...	...	...
Meigsville	1,078	8	7.42	1	1	1	...	...	...	...	...	...	...	...
Penn	1,007	4	3.97	...	...	...	...	...	...	...	...	...	...	...
Windsor	1,745	17	9.74	...	4	...	...	...	...	...	...	...	...	...
Morrow—														
Bennington	777	10	12.87	...	...	...	...	...	...	...	...	...	...	...
Chester	661	1	1.51	...	...	...	...	...	...	...	...	...	...	...
Congress	983	6	6.10	...	...	...	...	...	...	...	...	...	...	...
Harmony	711	5	7.03	...	...	...	...	...	...	...	...	...	...	1
Perry	935	7	7.49	1	...	...	...	...	...	...	...	...	...	...
South Bloomfield	742	3	4.04	...	...	...	...	...	...	...	...	...	...	...
Troy	641	8	12.48	...	...	...	...	...	...	...	...	...	1	...
Muskingum—														
Cass	977	9	9.21	1	...	...	...	...	...	...	...	...	...	...
Falls	1,680	9	5.36	...	...	...	...	...	...	...	...	...	...	...
Highland	674	3	4.45	...	...	...	...	...	...	...	...	...	...	...
Hopewell	1,372	15	10.93	...	...	1	...	...	...	...	...	3	1	...
Jackson	816	2	2.45	...	...	...	...	...	...	...	...	...	...	...
Madison	900	3	3.33	...	...	...	...	...	...	...	...	1	...	...
Monroe	813	3	3.69	...	...	...	...	...	...	...	...	...	...	...
Muskingum	812	2	2.46	...	...	...	...	...	...	...	...	...	...	...
Salt Creek	1,024	7	6.84	...	...	...	...	...	...	...	...	1	...	...
Springfield	1,504	1	.66	...	...	...	...	...	...	...	...	...	...	...
Union	817	3	3.67	...	...	...	...	...	...	...	...	...	...	...
Wayne	1,624	7	4.31	...	...	...	...	...	...	...	...	...	...	...
Noble—														
Brookfield	897	7	7.83	...	...	...	...	...	...	...	...	...	...	...
Buffalo	1,033	7	6.77	1	...	...	...	...	...	...	...	1	...	...
Elk	1,357	9	6.63	...	...	...	...	...	...	...	...	...	...	...
Jackson	1,152	6	5.21	...	...	...	...	...	...	...	...	...	...	...
Jefferson	1,005	6	5.97	1	3	1	...	...	...	...	...	...	...	...
Seneca	934	6	6.42	...	1	1	...	...	...	...	...	1	...	...
Ottawa—														
Allen	1,613	5	3.10	...	...	...	...	...	...	...	...	...	...	...
Benton	2,341	15	6.41	2	...	...	...	...	...	...	1	...	...	...
Carroll	1,734	7	4.04	...	...	1	...	...	...	...	...	...	1	...
Catawba Island	606	13	21.45	2	...	...	...	...	...	...	...	...	1	...
Erie	616	3	4.87	...	...	...	...	...	...	...	...	...	...	...
Harris	1,176	7	5.95	...	...	...	...	...	...	...	...	...	...	...
Put-in Bay	723	5	6.92	...	...	...	...	...	...	...	...	1	...	...
Paulding—														
Brown	1,700	15	8.82	...	...	2	...	...	...	...	...	...	...	1
Harrison	1,797	16	8.90	1	...	...	...	...	...	...	...	...	1	...
Latty	1,901	9	4.73	3	...	2	...	...	...	...	...	...	1	2
Paulding	1,703	1	.59	1	...	...	...	...	...	...	...	1	...	...
Perry—														
Bearfield	923	11	11.92	...	4	...	...	...	...	...	...	5	...	...
Jackson	1,228	6	4.89	...	...	...	...	...	...	...	...	...	...	...
Madison	651	1	1.54	...	...	...	...	...	...	...	...	...	...	...
Pleasant	860	9	10.46	2	1	...	...	...	...	...	...	...	...	...
Reading	1,843	11	5.97	2	1	1	...	...	...	...	...	...	...	...
Salt Lick	1,367	2	1.46	1	...	...	...	...	...	...	...	...	...	...
Pickaway—														
Deer Creek	1,126	10	8.88	3	...	...	...	...	...	...	...	...	...	...
Jackson	1,205	7	5.81	3	...	...	...	...	...	...	...	...	...	...
Muhlenburg	668	9	13.47	...	...	...	...	...	...	...	...	...	...	...
Perry	1,173	1	.85	...	1	...	...	...	...	...	...	1	...	...
Pickaway	1,231	6	4.87	...	2	...	...	...	...	...	...	...	...	...
Salt Creek	1,292	15	11.61	...	3	...	...	...	...	...	...	1	...	...
Washington	1,050	13	12.38	...	1	...	...	...	...	...	...	...	...	...
Pike—														
Camp Creek	983	3	3.05	...	...	...	...	...	...	...	...	...	...	...
Jackson	2,021	14	6.93	...	2	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
	2						2	1			1					2	3		1	
	1		1				1			1								3		1
			1				3													
	1	1	1			4		1		6	1							2		
	2		1			1	2	1	2								1			
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			1			1	1	2									1			
						1	1			1							1			
	1									1						1	2	1	1	
							3													1
						1	1	1			1						3			
						2				1		1					2		2	1
		2	2		3			2												
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	2	1		1			2	1			1						1	1		
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	1									1	1									
						1											1			1
			1			2		2											1	
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			1														2			
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		1				1	1										4			
						1						1				1	3			2
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	1					1		1			1						2			
						1		1	1							2				
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								1		1						1	2			1
	1	1	1		3	2	2	2	1									1		
							1										1	1	2	
			2	1		3	1		1		1						1	1	1	
								1		1									1	
	2		1				1			1									2	
	1						2											1		
	2					3		2		1	1	1					2			
	1	2	1			5	2			1						1	2			2
1				1		1											1			1
			1					1		1							1	1	1	1
					1	1	1	1	2											
										1										
	1		1			3	1	1		1		1								
	2		1			1	1									1	1		3	2
		1																1		
		1				3	1	2								1	1			1
																3	3		1	
		1	1	5			1									1				
						2		1									1		2	
	1	2	1			1	4	1	1							1	2			
	2		1				1			2	1			2			2	2		
		1			1		1													
	2					2				1		2					5	2		1

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Pike—Concluded.														
Pebble	1,288	3	2.33	...	...	1	...	...	...	...	...	...	...	...
Scioto	1,124	1	.89	1	...	...	...	...	...	...	...	...	...	...
Sunfish	1,068	4	3.75	...	1	...	...	...	...	...	...	...	...	...
Portage														
Brimfield	999	11	11.01	3	...	3	...	...	...	...	...	...	...	...
Charlestown	688	7	10.17	...	...	...	...	...	...	...	...	...	...	...
Deerfield	1,101	11	9.99	1	...	...	...	...	...	...	1	...	...	...
Franklin	885	14	15.82	2	...	...	...	...	...	...	...	...	...	...
Freedom	670	5	7.46	...	...	...	...	...	...	...	...	...	...	...
Garrettsville	1,145	15	13.10	...	...	...	...	...	...	...	...	...	...	...
Nelson	794	3	3.78	...	2	...	...	...	...	2	...	1	...	...
Paris	568	5	8.80	...	...	...	...	...	...	...	...	...	...	...
Randolph	1,389	5	3.60	...	...	...	...	...	...	...	...	...	...	...
Ravenna	990	1	1.01	...	...	...	...	...	...	1	...	...	...	...
Rootstown	1,127	10	8.87	1	...	...	...	...	...	...	...	...	2	...
Streetsboro	672	4	5.95	...	1	...	...	...	...	...	...	...	...	...
Preble														
Dixon	978	3	3.07	...	...	...	...	...	...	...	...	...	...	...
Gratis	1,351	19	14.06	3	...	...	...	...	...	...	...	1	...	...
Israel	1,257	18	14.32	2	...	...	...	...	...	...	...	...	...	...
Jackson	1,255	9	7.17	...	1	...	...	...	...	...	...	...	...	...
Somers	918	5	5.45	...	...	...	...	...	...	...	...	...	...	...
Washington	1,720	13	7.56	2	1	...	...	...	...	...	...	...	...	...
Putnam														
Jackson	1,308	3	2.29	1	...	...	...	...	...	...	...	...	...	...
Jennings	1,465	11	7.51	...	...	...	...	...	...	...	...	...	...	...
Monterey	1,342	15	11.18	1	1	...	...	...	...	...	1	...	...	1
Palmer	1,827	2	1.09	...	...	...	...	...	...	1	...	1	...	...
Richland														
Blooming Grove	978	5	5.11	...	...	...	...	...	...	...	...	...	...	...
Butler	765	4	5.23	...	...	...	...	...	...	...	...	...	...	...
Cass	720	21	29.17	1	...	...	...	...	...	...	...	1	...	...
Madison	800	2	2.50	...	...	...	...	...	...	...	...	...	...	...
Monroe	1,224	9	7.35	1	2	1	...	...	...	...	...	...	...	...
Plymouth	736	6	8.15	...	...	...	...	...	...	...	...	...	1	...
Sandusky	598	2	3.34	...	...	1	...	...	...	...	...	...	...	...
Sharon	866	1	1.15	...	...	...	...	...	...	...	...	...	...	...
Springfield	1,373	3	2.18	...	...	...	...	...	...	...	...	...	...	...
Weller	938	7	7.46	...	...	...	...	...	...	...	...	...	...	...
Worthington	1,258	10	7.95	1	...	...	...	1	...	...	...	...	...	...
Jefferson	1,293	18	13.92	...	...	...	...	...	...	...	...	...	...	...
Ross														
Concord	2,240	34	15.18	8	12	...	...	...	...	...	...	...	1	...
Green	1,276	2	1.57	...	1	...	...	...	...	...	...	2	...	...
Harrison	1,162	2	1.72	...	...	...	...	...	...	...	...	...	...	...
Jefferson	936	1	1.07	...	1	...	...	...	...	...	...	1	...	...
Springfield	1,133	7	6.18	...	2	...	...	...	...	...	...	...	...	...
Twin	1,899	13	6.85	...	...	2	...	...	...	...	1	...	...	...
Union	2,317	11	4.75	...	...	...	...	...	...	...	...	...	...	...
Sandusky														
Green Creek	1,591	19	11.94	...	...	...	...	...	...	...	...	...	3	...
Jackson	1,600	10	6.25	1	1	...	...	...	...	...	...	...	...	...
Sandusky	1,842	8	4.34	...	...	...	...	...	...	...	...	...	...	...
Scioto														
Bloom	1,713	23	13.43	...	...	3	...	...	...	...	...	...	...	1
Madison	1,664	5	3.00	...	...	...	...	...	...	...	5	...	...	...
Morgan	1,035	1	.97	...	...	...	...	...	...	...	...	1	...	...
Valley	1,039	6	5.77	...	...	...	...	...	...	...	...	...	...	...
Vernon	918	2	2.18	...	1	...	...	...	...	...	...	2	...	...
Washington	1,269	4	3.15	...	...	...	...	...	...	...	...	...	...	...
Seneca														
Big Spring	1,618	12	7.42	...	...	...	...	...	...	...	...	...	1	...
Bloom	1,218	10	8.21	...	...	...	...	...	...	...	...	...	...	...
Hopewell	1,528	8	5.24	...	...	...	...	...	...	...	...	...	...	...

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										2										
								1												
	2						1	1												
						2		1			1						1	1	1	1
			2		1		1	1									1		1	
					2	1	1	1	1								2		2	
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						1	1			1	1								1	
	1					4	4		1	2							2	1		
	1		1			2	1													
			1			2	1										1			
							3		1	1							3			
						1		1	1			1								
					1												1		1	
	3		1		1	1	6				1					2	2		1	
	1		1		7			3	1							3		1	1	
	2		1							2							3	1		2
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1	1	1			1	1	1			3	1							1	2	
	1					1											1			
	3		2				1	1									3		1	
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					1	3	1	2		1										1
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	1							1										1		
						3			1	1	1								1	
						1	1	1									3	1	1	1
						2	4	1	2	1	1						6	1		
	3		1		5	5	4	3		4	1							1	6	
						1		1												
							2			1	1							1	2	
	3						1	4		1	1									
	1		2	1		2	1	2			1					1				
4	1							4			3	1					2	1		3
	1					1	2	1			1					1	1	2		
				1							1						5	1		
	6					1	2			4	1	1				2		2		4
	4		1															1		
	1	1			2															
	2		1	2		2	1			1							2			
	1					2					1	1					2	2	1	4
	1	1			4		1											1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Seneca—Concluded.														
Liberty	1,459	17	11.65	1	2	2	...	...	...	...	...	1	...	...
Scipio	965	5	5.18	...	...	1	...	...	...	...	...	...	...	...
Thompson	1,545	18	11.65	2	2	...	...	...	...	...	...	1	...	...
Shelby—														
Clinton	1,149	24	20.89	2	3	1	...	...	...	...	...	...	...	...
Cynthian	1,402	3	2.14	...	1	...	...	...	...	...	...	...	...	...
Washington	623	6	9.63	...	...	...	...	...	...	...	...	...	...	...
Stark—														
Bethlehem	1,273	4	3.14	...	...	1	...	...	...	...	...	...	...	...
Canton	3,341	14	4.19	4	...	...	...	...	...	1	...	...	...	...
Jackson	2,090	9	4.31	...	...	...	...	...	...	...	...	...	...	...
Lake	2,312	1	.43	...	...	...	...	...	...	...	...	...	...	...
Lawrence	2,972	19	6.39	...	...	...	...	...	...	...	...	...	...	1
Marlboro	1,829	1	.55	...	...	...	...	...	...	...	...	1	...	...
Nimishillen	1,839	1	.54	...	...	...	...	...	...	1	...	...	...	...
Osnaburg	1,608	18	11.19	...	...	...	...	...	...	...	...	1	...	...
Perry	3,205	14	4.37	...	...	...	...	...	...	...	...	...	...	...
Pike	1,491	22	14.76	...	...	...	...	...	...	...	...	...	...	...
Plain	3,624	52	14.35	...	...	1	...	...	...	...	...	1	...	...
Sandy	637	6	9.42	1	1	...	...	...	...	...	...	...	...	...
Tuscarawas	4,139	25	6.04	3	3	...	...	...	...	2	...	...	...	...
Washington	1,668	16	9.59	...	...	3	...	...	...	...	...	...	...	...
Summit—														
Copley	802	9	11.22	1	...	...	...	...	...	...	...	2	...	...
Coventry	1,790	8	4.47	2	2	...	...	...	...	...	...	1	...	...
Franklin	2,024	13	6.42	3	6	1	...	...	...	...	...	1	...	...
Green	1,602	15	9.36	1	...	...	...	...	2	...	...	...	1	...
Northampton	814	7	8.60	...	...	...	...	...	...	...	...	...	...	...
Northfield	1,050	8	7.62	...	...	...	...	...	...	...	...	...	...	...
Norton	1,674	19	11.35	2	...	...	...	...	...	...	...	...	...	...
Richfield	930	5	5.38	...	...	...	...	...	...	...	...	1	...	...
Stow	970	6	6.19	...	...	...	...	...	...	...	...	...	...	...
Trumbull—														
Braceville	867	10	11.53	2	...	...	...	...	...	...	...	...	...	...
Farmington	723	11	15.21	...	1	...	...	...	...	...	...	...	...	...
Fowler	764	7	9.16	...	...	...	...	...	...	...	...	...	...	...
Greene	841	16	19.02	1	...	...	...	...	...	...	...	...	...	...
Hartford	1,195	8	6.77	...	...	...	...	...	...	...	...	...	...	1
Johnston	753	10	13.28	...	...	...	...	...	...	...	...	...	...	...
Lordstown	722	8	11.08	...	...	...	...	...	...	...	...	...	...	...
Mecca	789	15	19.01	...	...	...	...	...	...	...	...	3	...	...
Vernon	824	14	16.99	...	2	1	...	...	...	...	1	...	1	...
Vienna	942	9	9.55	1	...	...	...	...	...	...	...	...	...	...
Warren	1,060	14	13.21	1	...	...	...	...	...	...	...	...	...	...
Weathersfield	1,598	2	1.25	...	2	...	...	...	...	...	...	2	...	...
Tuscarawas—														
Bucks	1,223	3	2.45	...	...	...	...	...	...	...	...	...	...	...
Dover	2,147	13	6.05	2	1	1	...	...	...	1	...	...	...	...
Fairfield	1,144	1	.87	...	1	...	...	...	...	...	...	1	...	...
Oxford	851	11	12.92	...	...	1	...	...	...	...	...	...	...	...
Union	825	3	3.64	...	1	...	...	...	...	...	...	1	...	...
Warwick	1,632	11	6.74	7	...	...	...	...	...	...	...	...	1	...
Wayne	1,132	7	6.18	1	...	1	...	...	...	...	...	...	...	...
Union—														
Allen	957	7	7.31	...	...	...	...	...	...	...	...	...	...	...
Claibourne	1,401	18	12.85	2	...	...	...	...	...	...	...	...	1	2
Dover	893	4	4.48	...	4	...	...	...	2	...	2	...	...	...
Jerome	1,307	1	.77	...	...	...	...	...	...	...	...	...	...	...
Mill Creek	688	6	8.72	...	1	...	...	...	...	...	...	...	...	...
Taylor	1,156	7	6.06	1	...	1	...	...	...	...	...	...	...	...
York	1,437	2	1.39	...	...	...	...	...	...	...	...	...	...	...
Van Wert—														
Harrison	1,445	12	8.30	2	...	...	...	...	...	...	...	...	...	...
Hoaglin	1,608	1	.62	...	...	...	...	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Continued.

General Diseases.						Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Concluded.

Townships.	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.								
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.
Vinton—														
Brown	746	1	1.34	...	...	...	...	...	...	...	...	...	...	...
Clinton	1,010	6	5.94	2	...	...	...	...	...	...	...	...	...	...
Eagle	1,073	5	4.66	1	...	...	...	...	...	...	...	...	...	...
Elk	868	4	4.61	...	...	...	...	...	...	...	...	...	...	...
Madison	654	3	4.59	...	...	...	...	...	...	...	...	...	...	...
Swan	979	7	7.15	...	...	1	...	...	...	...	...	...	...	1
Vinton	1,336	10	7.48	...	4	...	...	...	...	...	...	...	...	1
Warren—														
Clearcreek	1,987	12	6.04	...	...	...	...	...	...	...	...	...	...	...
Deerfield	1,539	14	9.10	2	...	...	...	...	...	...	...	1	...	...
Franklin	1,791	6	3.35	...	...	...	...	...	...	...	...	...	...	...
Hamilton	1,693	7	4.13	...	...	...	...	...	...	...	...	...	...	...
Massie	735	6	8.16	...	...	...	...	...	...	...	...	...	...	...
Salem	916	7	7.64	...	...	...	...	...	...	...	...	...	...	...
Turtle Creek	2,341	24	10.25	...	2	...	...	...	...	...	...	...	...	...
Washington	1,062	11	10.36	...	...	1	...	...	...	...	...	...	...	...
Washington—														
Aurelius	806	5	6.20	...	...	...	...	...	...	...	...	...	...	...
Belpre	2,761	25	9.05	...	...	2	...	...	...	...	...	1	...	...
Independence	1,632	2	1.23	...	...	...	...	...	...	...	...	...	...	...
Marietta	2,416	15	6.21	...	...	1	...	...	...	...	...	...	...	2
Newport	2,564	9	3.51	1	...	...	...	...	...	...	...	...	...	...
Salem	1,310	20	15.27	2	2	1	...	...	...	1	...	...	1	...
Warren	1,813	11	6.07	...	1	...	...	...	...	...	...	1	...	...
Waterford	1,557	17	10.92	1	1	1	...	...	...	...	...	...	2	1
Wayne—														
Baughman	1,529	5	3.27	...	...	...	...	...	...	...	...	...	...	...
Chippewa	1,818	14	7.70	...	5	...	...	...	...	...	...	...	1	...
East Union	1,418	7	4.94	3	...	...	...	...	...	...	...	...	...	...
Green	1,616	18	11.14	3	...	...	...	...	1	...	...	...	...	...
Paint	1,044	8	7.66	...	1	1	...	...	1	...	...	...	1	...
Williams—														
Brady	978	6	6.13	...	...	...	...	...	...	...	...	...	...	...
Florence	1,504	1	.66	...	...	...	...	...	...	...	...	...	...	...
St. Joseph	1,090	11	10.09	4	...	1	...	...	...	...	...	...	...	1
Wood—														
Freedom	1,184	8	6.76	...	...	...	...	...	...	...	...	...	...	...
Henry	1,900	10	5.26	...	...	...	...	...	...	...	...	...	...	...
Jackson	1,448	2	1.38	...	...	1	...	...	...	...	...	...	...	...
Milton	1,554	12	7.72	2	...	...	...	...	...	...	...	...	...	...
Montgomery	1,637	8	4.89	3	...	...	...	...	...	...	1	...	...	...
Perrysburg	2,514	6	2.39	1	2	...	...	...	...	5	...	1	...	...
Plain	1,120	2	1.79	...	...	...	...	...	...	...	...	...	...	...
Ross	1,133	7	6.18	...	...	2	...	...	...	...	...	...	...	...
Webster	1,303	5	3.84	...	...	1	...	...	...	...	...	...	...	...
Weston	659	19	28.83	...	...	...	...	...	...	...	...	...	...	...
Wyandot—														
Mifflin	1,067	2	1.87	...	...	2	...	...	...	...	...	...	...	...
Salem	1,190	5	4.20	1	...	1	...	...	...	...	...	...	...	...
Tymochtee	1,397	5	3.58	...	...	...	...	...	...	...	...	...	...	...
Totals	691,804	4,553	6.58	293	230	151	6	3	21	38	37	91	63	34

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908 —Concluded.

General Diseases.								Diseases of Respiratory System.												
Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
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26	353	105	204	37	169	493	512	348	94	329	231	56	6	28	15	127	520	204	215	162

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

	Population.	Total Deaths.	Annual Rate per 1,000.	Age.		General Diseases.												
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.
Cities (62)......	2,288,720	30,124	13.16	4,805	1,781	667	7	3	121	127	141	292	320	64	247	3,100	370
Villages (349)...	493,637	5,165	10.46	349	200	112	5	..	24	19	25	46	61	37	48	449	92
Townships(540)	691,804	4,553	6.58	293	230	151	6	3	21	38	37	91	63	34	26	353	105
Totals.....	3,474,161	39,842	11.47	5,447	2,211	930	18	6	166	184	203	429	444	135	321	3,902	567

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1908.

General Diseases.					Diseases of Respiratory System.													
Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
1,416	86	873	3,596	3,287	2,570	1,097	3,272	1,949	266	103	54	124	1,539	1,342	2,141	679	1,663
250	44	145	594	639	364	110	432	301	63	14	22	14	112	416	427	214	229
204	37	169	493	512	348	94	329	231	56	6	28	15	127	520	204	215	162
1870	167	1,187	4,683	4,438	3,282	1,301	4,033	2,481	385	123	104	153	1,778	2,278	2,772	1,108	2,054

SUMMARY OF MORTALITY REPORTS.

The total number of deaths reported from all causes—excluding premature and still births—by the cities, villages and townships represented in the preceding tables was 39,842. The population of the cities, villages and townships represented (estimated) was 3,474,161,which is equal to an annual death rate of 11.47 per thousand living population represented.

The deaths in 3,537,781 living population (estimated) in 1907 were 42,892, equal to an annual death rate of 12.12 per thousand; while in 1906 the total number of deaths reported in 3,607,389 population was 42,830, equal to a mortality of 11.87 per thousand.

DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.

The number of deaths reported of children under five years of age (premature and still born excluded) was 7,658, which is equal to 19.23 per cent. of the deaths from all causes, and a death rate of 2.2 per thousand population represented. The death rate of children under five the preceding year was 2.3 per thousand population represented.

GENERAL DISEASES.

The total number of deaths reported from general diseases was 10,529, which is equal to 26.4 per cent. of the deaths reported from all causes, and an annual rate of 3.04 per thousand population represented.

The number of deaths reported the preceding year for these diseases was 11,402, equal to a mortality rate of 3.2 per thousand of the population represented.

CROUP AND DIPHTHERIA.

The total number of deaths reported from croup and diphtheria was 429, which is equal to 1.08 per cent. of the deaths reported from all causes, and a death rate of .12 per thousand of the population represented.

The number of deaths reported the preceding year from these causes was 577, equal to a mortality rate of .16 per thousand of the population represented.

MEASLES, SCARLET FEVER AND WHOOPING COUGH.

The total number of deaths reported from measles, scarlet fever and whooping cough was 553, which is equal to 1.39 per cent. of the number of deaths reported from all causes, and a mortality rate of .16 per thousand of the population represented.

The total number of deaths reported from these diseases during the preceding year was 648, equal to a mortality rate of .18 per thousand population represented.

TYPHOID FEVER.

The total number of deaths reported from typhoid fever was 930, which is equal to 2.33 per cent. of the total number reported from all causes, and a mortality rate of .26 per thousand of the population represented.

The number of deaths reported from this cause the preceding year was 1,053, equal to a mortality rate of .30 per thousand population represented.

CANCER.

The total number of deaths reported from cancer was 1,870, which is equal to 4.7 per cent. of the deaths reported from all causes, and a mortality rate of .54 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,890, equal to a mortality rate of .53 per thousand population represented.

PULMONARY TUBERCULOSIS.

The total number of deaths reported from pulmonary tuberculosis was 3,902, which is equal to 9.8 per cent. of the deaths reported from all causes, and a mortality rate of 1.12 per thousand population represented.

The number of deaths reported from this cause the preceding year was 4,035, equal to a mortality rate of 1.14 per thousand population represented.

DISEASES OF THE NERVOUS SYSTEM.

The total number of deaths reported from diseases of the nervous system was 4,683, which is equal to 11.75 per cent. of the deaths reported from all causes, and a mortality rate of 1.35 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,839, equal to a mortality rate of 1.37 per thousand population represented.

DISEASES OF THE CIRCULATORY SYSTEM.

The total number of deaths reported from diseases of the circulatory system was 4,438, which is equal to 11.1 per cent. of the deaths reported from all causes, and a mortality rate of 1.28 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,759, equal to a mortality rate of 1.35 per thousand population represented.

DISEASES OF THE RESPIRATORY SYSTEM.

The total number of deaths from diseases of the respiratory system was 4,583, which is equal to 11.5 per cent. of the deaths reported from all causes, and a mortality rate of 1.3 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 5,298, equal to a mortality rate of 1.5 per thousand population represented.

DISEASES OF THE DIGESTIVE SYSTEM.

The total number of deaths reported from diseases of the digestive system was 4,033, which is equal to 10.12 per cent. of the deaths reported from all causes, and a mortality rate of 1.17 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,268, equal to a mortality rate of 1.26 per thousand population represented.

DISEASES OF THE GENITO-URINARY SYSTEM.

The total number of deaths reported from diseases of the genito-urinary system was 2,481, which is equal to 6.23 per cent. of the deaths from all causes, and a mortality rate of .71 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 2,652, equal to a mortality rate of .75 per thousand population represented.

PUERPERAL CONDITIONS.

The total number of deaths reported from puerperal conditions was 385, which is equal to .97 per cent. of the deaths reported from all causes, and a mortality rate of .11 per thousand population represented.

The number of deaths reported the preceding year from these causes was 451, equal to a mortality rate of .13 per thousand population represented.

DISEASES OF THE SKIN AND CELLULAR TISSUE.

The total number of deaths from diseases of the skin and cellular tissue was 123, which is equal to .31 per cent. of the deaths reported from all causes, and a mortality rate of .035 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 126, equal to a mortality rate of .036 per thousand population represented.

DISEASES OF ORGANS OF LOCOMOTION.

The total number of deaths reported from diseases of the organs of locomotion was 104, which is equal to .26 per cent. of the deaths reported from all causes, and a mortality rate of .03 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 111, equal to a mortality rate of .031 per thousand population represented.

MALFORMATIONS.

The total number of deaths reported from malformations was 153, which is equal to .38 per cent. of the deaths reported from all causes, and a mortality rate of .044 per thousand population represented.

The number of deaths reported the preceding year from these causes was 147, equal to a mortality rate of .042 per thousand population represented.

INFANTILE DISEASES.

The total number of deaths reported from infantile diseases was 1,778, which is equal to 4.46 per cent. of the deaths reported from all causes, and a mortality rate of .51 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 1,661, equal to a mortality rate of .47 per thousand population represented.

OLD AGE.

The total number of deaths reported from old age was 2,278, which is equal to 5.72 per cent. of the deaths reported from all causes, and an annual rate of .66 per thousand population represented.

The number of deaths reported the preceding year from this cause was 2,676, equal to a mortality rate of .76 per thousand population represented.

VIOLENCE.

The total number of deaths from violence was 2,772, which is equal to 6.96 per cent. of the deaths reported from all causes, and a mortality rate of .80 per thousand population represented.

During the preceding year there were 3,010 deaths reported from violence, equal to a mortality rate of .85 per thousand population represented.

ILL-DEFINED DISEASES.

The total number of deaths reported from ill-defined diseases was 1,108, which is equal to 2.78 per cent. of the deaths reported from all causes, and a mortality rate of .32 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 1,308, equal to a mortality rate of .37 per thousand population represented.

PREMATURE AND STILL BIRTHS.

The total number of premature and still births reported was 2,054, which is equal to 5.16 per cent. of the deaths reported from all causes, and a mortality rate of .59 per thousand population represented.

During the preceding year there were 2,332 premature and still births reported, equal to a rate of .66 per thousand population represented.

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